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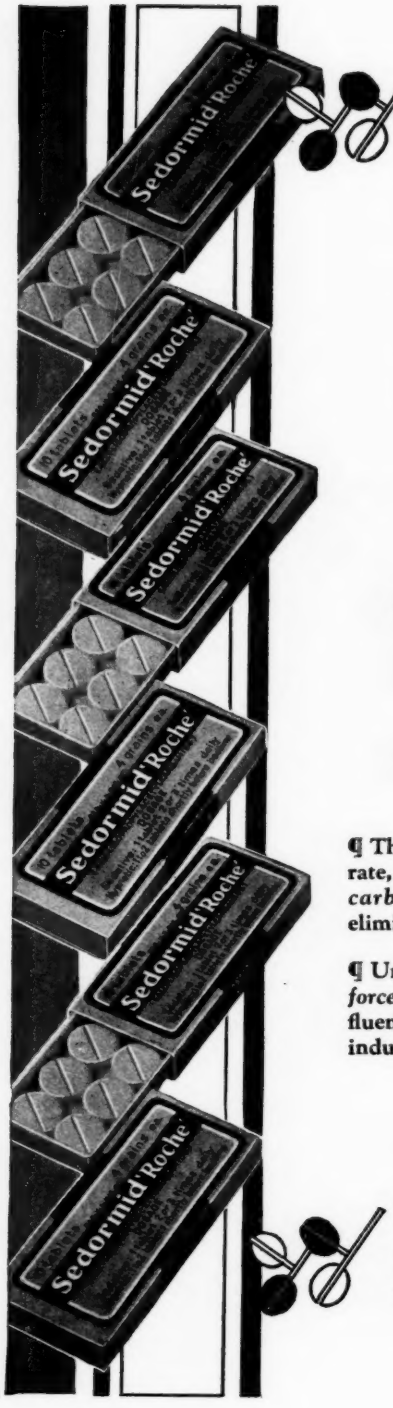

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(6) Since the frequency, duration and intensity of the fever can be accurately controlled, the reaction produced in each patient can be more nearly standardized. This will enable us to learn the most favorable temperature curve."

*King, J. Cash, and Cocke, Edwin W.: Therapeutic Fever Produced by Diathermy, with Special Reference to its Application in the Treatment of Paresis. South. Med. Jour., Mar., 1930.

A copy of this reprint in full will be mailed on request, together with further information on the Victor Diathermy Apparatus as designed for this work.

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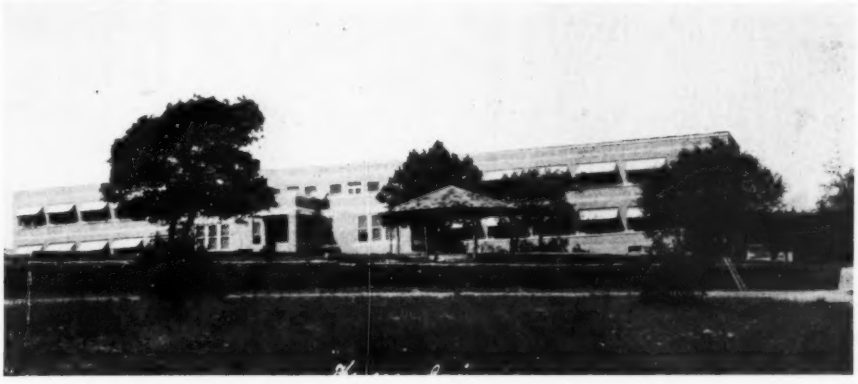

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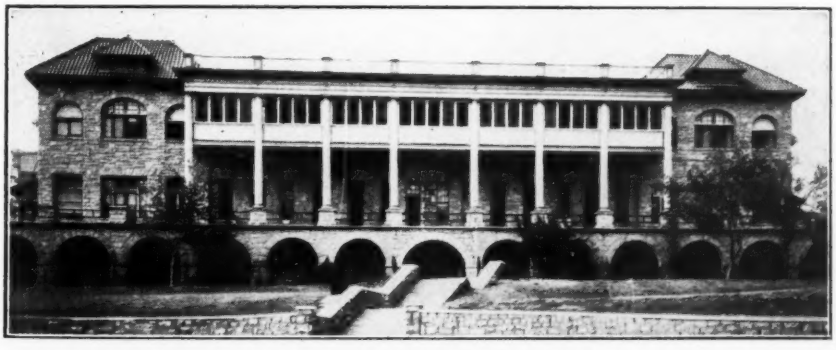

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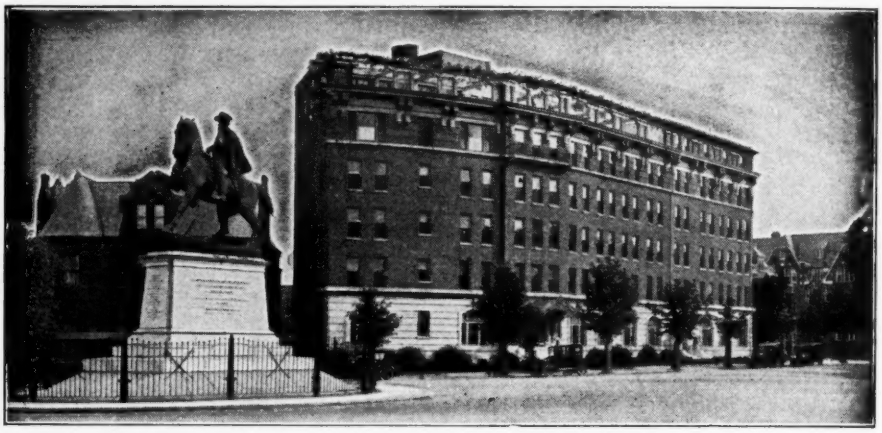

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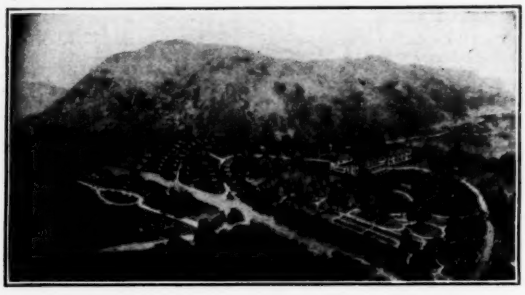

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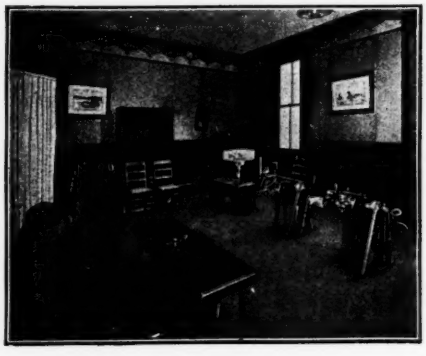

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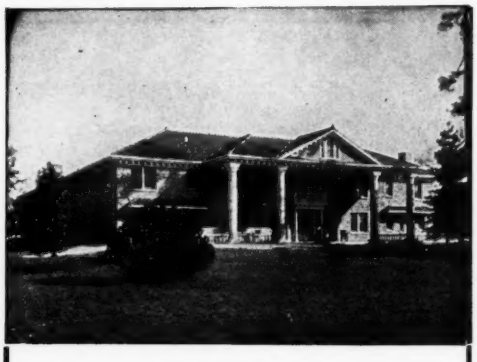

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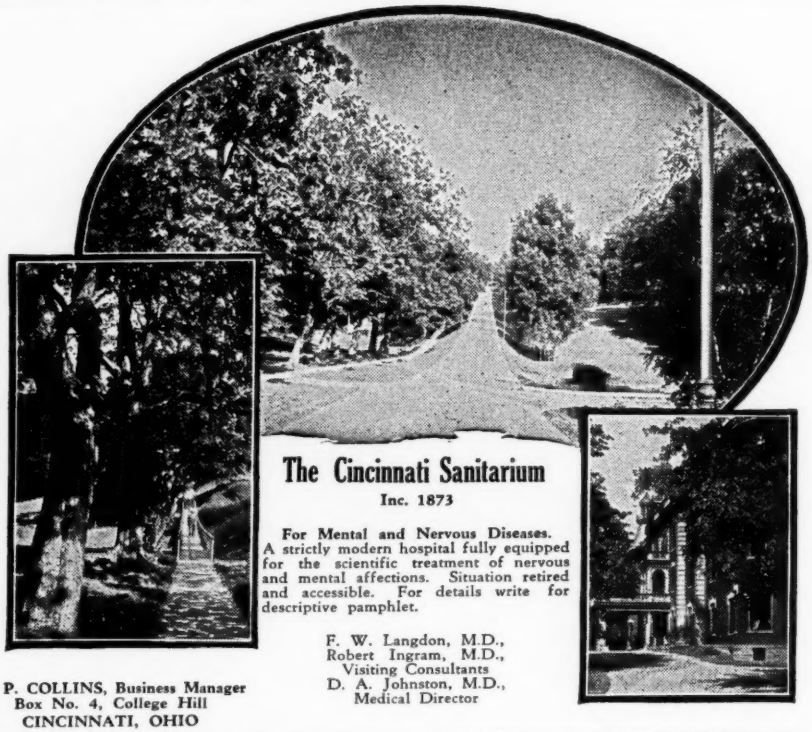

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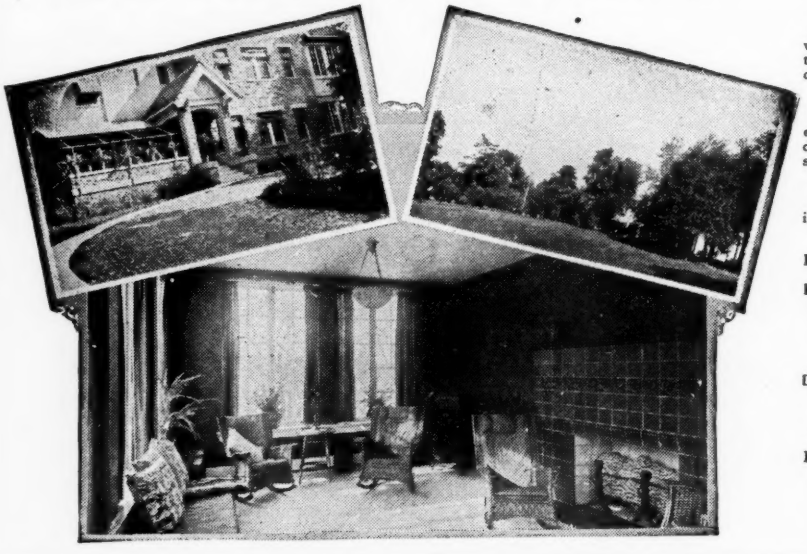

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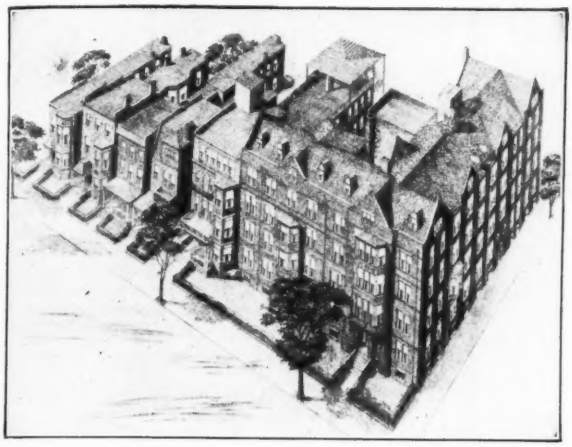

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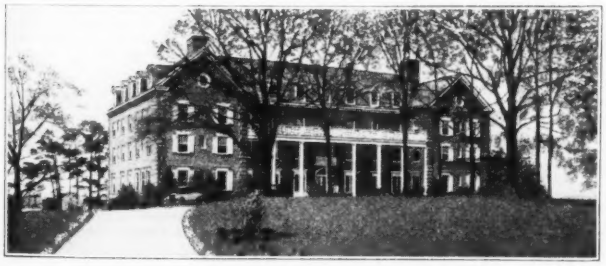

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GRANULOMATOUS AND ULCERATIVE LESIONS OF THE FEMALE GENITALIA*

By JOHN C. BURCH, M.D.,
Nashville, Tenn.

The difficult subject of ulcerations of the vulva has been much complicated by the similarity of various lesions and the use of many meaningless terms. I have been quite fortunate in having an abundant material of this nature, and from this material it has been possible to draw several conclusions which have been of help in classifying and diagnosing the cases.

The common ulcerations of the vulva are due to chancre, chancroid, kraurosis, skin affections, carcinoma, granuloma inguinale, syphilomata and chronic hypertrophic vulvitis.

The differential diagnosis of chancre, chancroid, kraurosis and the various skin affections is at times difficult, but is sufficiently well known not to require discussion before this distinguished body. It is the group of granuloma, syphiloma and chronic hypertrophic vulvitis that I desire to call to your attention today.

CHRONIC HYPERTROPHIC VULVITIS

This group, so designated by Taussig, is clinically characterized by enlargement of the labia, induration of the surrounding skin and ulceration. The patients are usually negroes, generally have a history of syphilis or a positive Wassermann, and the lesion is generally of several months' duration. The skin over the enlarged areas is markedly thickened and roughened. Condylomata are generally present. The parts are covered by a foul discharge. The inguinal glands are enlarged and mild fever may be present. Anemia is a rather prominent symptom. The tumors are usually not very painful and the patients seek relief on account of the discharge. Examination of the cervical secretions frequently reveals a gonorrheal infection. The pathological examination of such a specimen shows a decided hyperplasia of the skin with numerous large papillary processes, with or without mitoses, dipping deep into a corium which is vascular and edematous and filled with an inflammatory exudate of large and small mononuclears. Polymorphonuclears are in the skin itself and just underneath. No gummata giant cells or tubercles are seen. This disease has been frequently called syphilis of the vulva, although it does not respond to antiluetic treatment, has not a specific histological picture of syphilis, and occurs at times in people who have never had syphilis. It is nevertheless true that most of these have or have had syphilis.

From observing cases in the various stages of the disease it has been possible to trace its development and define its etiology. Consider those who have lues. Hyperplasia and condyloma formation on the skin of the vulva are common and well known secondary lesions. They contain numerous folds and projections, are impossible to keep clean, always secondarily infected, and hence prone to ulceration. When ulceration takes place an inflammatory exudate is poured out in the underlying tissue at the edge of the ulcer. From this infected area lymphangitis and lymphadenitis of the vulval lymphatics and inguinal glands occur. This in turn causes edema in the infected area and further enlargement. Edema, as has been brilliantly shown by Harrison, Pilcher and Blalock, decreases the oxygen tension in the tissues and so decreases their resistance to infection. Hence, we have a vicious cycle which results in these bizarre lesions. Condylomata and epithelial hyperplasias are not specific manifestations of lues, but may result from any chronic infection or irritant, provided it is of sufficient intensity and duration to cause hyperplasia and ulceration.

*Read in Section on Gynecology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

*From the Department of Obstetrics and Gynecology, Vanderbilt University, School of Medicine.

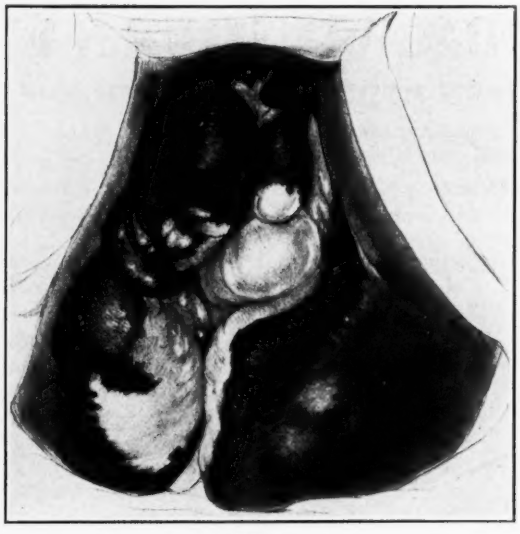

Fig. 1
Syphilitic elephantiasis of vulva.

It is now quite clear why these lesions do not show gummata and do not respond to antiluetic treatment. The enlargements and ulcerations are the result of a chronic non-specific infection and the luetic changes in the skin are predisposing causes of this infection.

The continued irritation of the skin, as might be expected, causes extreme hyperplasia, and this hyperplasia is fully able to proceed to a definite cancer. This has occurred twice in our series and I feel that these lesions may justly be considered as precancerous. The dividing line between hyperplasia and cancer is not sharp and the utmost care should be taken in making the diagnosis of cancer.

SYPHILOMA

These tumors are very rare and are in reality gummata of the vulva. They are the result of a leutic infection and arise as tumors underneath the skin before ulceration and secondary infection are evident. In hypertrophic vulvitis the tumor formation is a sequel of ulceration and infection, while in syphiloma the presence of the tumor leads to ulceration and infection. It is true that the inflammatory reaction seen in chronic ulcerative vulvitis is of a type that could be produced by syphilis, but is not specific for syphilis and can be produced by non-specific and tuberculous infections as well as by granuloma inguinale. Since there is nothing about the type of inflammatory reaction except the typical gumma which is characteristic of lues in this location, I feel that it would be wise to limit this term to definite gummata. Stein and Gallagher have both reported cases of this type. One such case was seen in this series, where the typical histological picture of gumma was seen. If ulceration and infection take place the picture may be marked by the sequence of events which have been described in chronic ulcerative vulvitis. It is quite conceivable that in this type of mixed lesion cancer can develop. No such case has been observed in our series. Taus-

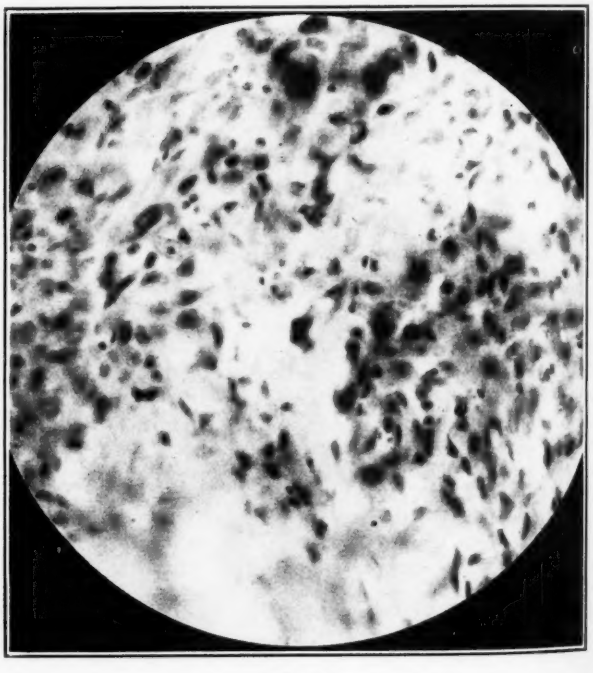

Fig. 2
(High power) syphilitic elephantiasis.

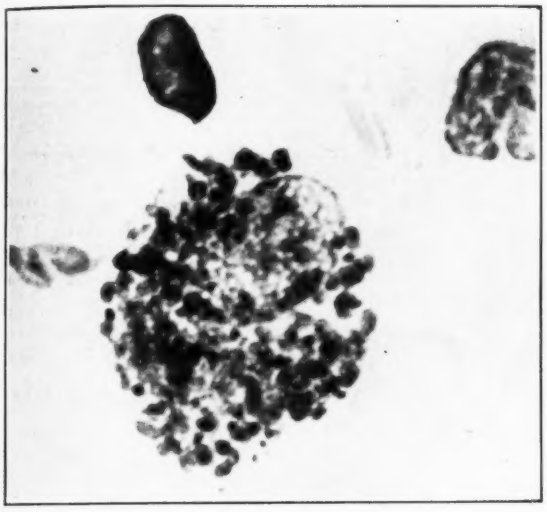

Fig. 3
Large mononuclear filled with Donovan bodies.

sig, in a recent article, however, mentions such an occurrence.

GRANULOMA INGUINALE

This interesting condition was first observed in this country by Symmers and Frost, in 1920, who recognized the bodies described by Donovan in 1905, which are pathognomonic of the condition. It is not within the scope of this paper to discuss the etiology of this condition and the many excellent bacterial studies to isolate the causative organism. Much of this work has been presented before this society. The question is still unsettled, but for our purpose the finding of Donovan bodies means that the patient has granuloma.

The disease is more common in the South than in the North and occurs more in negroes than in whites. A large number of those so infected have a concurrent luetic infection. The disease is not successively confined to the groin as its name implies, but this is its site of election. Cases have been observed in the face, neck, vulva and perivulval skin as well as the male genitalia. It is not transmitted by sexular intercourse. McIntosh has successfully transmitted the disease and states that the incubation period is forty-one days. Cases primarily arising elsewhere than on the vulva and perivulval skin do not concern us here.

The lesion begins as a papule, then becomes pustular, ruptures and discharges a serosanguinous fluid. From this beginning it gradually and slowly grows. It involves the vulva and causes chronic irritation and ulceration. The same vicious cycle which is seen in hypertrophic vulvitis can and does arise. In these mixed cases the two lesions are indistinguishable in their gross and microscopic appearances. The entire differentiation is in finding the Donovan bodies. All the lesions which are granulomatous will respond to tartar emetic, but healing may be incomplete in some on account of the hypertrophic vulvitis. It would seem logical if we adopt this view of granulomata to imagine that cancer could develop in the hyperplastic skin just as it does in the other types. I have not personally observed this, but Lynch reports such a case occurring in a male.

CANCER OF THE VULVA

Cancer of the vulva is not an infrequent disease and may occur as a result of the previously mentioned conditions or may arise primarily. Its appearance is variable, but frequently it is

Fig. 4
Granuloma inguinale.

mistaken for other conditions. It is more frequently mistaken for granuloma inguinale and grossly at times the two lesions are practically identical. The biopsy tells the tale.

Secondary syphilis, gonorrhea, irritating discharge, tertiary syphilis and granuloma inguinale cause hyperplasia and ulceration of the vulva directly or indirectly. This in turn sets up a vicious cycle of chronic inflammation, lymphangitis, lymphadenitis, edema, decreased oxygen tension, lowered resistance and more infection. This results in an elephantiasis, and it would be more accurate and descriptive to classify the above condition as

(1) Syphilitic elephantiasis of the vulva.
(2) Gonorrheal elephantiasis of the vulva.
(3) Granulomatous elephantiasis of the vulva.
(4) Non-specific elephantiasis of the vulva.

Treatment in these cases depends on finding out the underlying etiological factor for the elephantiasis. When specific measures have been applied and healing is incomplete or absent, then vulvectomy is indicated to remove the resistant tissue.

SUMMARY

The similarity of various kinds of ulcerative and granulomatous lesions of the female genitalia has been shown to be due to a vicious cycle resulting in a pseudo-elephantiasis. These diseases should all be classified according to their exciting causes and it is distinctly pointed out that the elephantiasis and hypertrophies are not a disease entity, but the result of a similar process occurring in several different types of diseases. With this in mind our series has been classified as follows:

Granulomatous	4
Syphilitic	7
Gonorrheal	3
Syphilis and gonorrhea	1
Carcinoma	5
Non-specific	4

The treatment of these diseases is specific against the etiological factors, but is the same against the elephantiasis.

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DISCUSSION (*Abstract*)

Dr. Richard W. TeLinde, Baltimore, Md.—I should like to ask Dr. Burch whether he has ever seen one of these cases in which the tumor disappeared following antiluetic treatment. My experience has been that a fair proportion have positive Wassermanns. It is, however, my impression that there is no single cause for all these cases. An ulcerative lesion, sometimes luetic, sometimes non-luetic, allows the entrance of secondary infection into the tissues. A lymphangitis follows, which at times results in lymphatic obstruction with resultant edema and fibrosis. These cases can be given arsphenamine indefinitely, but the tumor does not disappear regardless of whether the original lesion was or was not luetic. In our practice, we give a reasonable amount of arsphenamine and then proceed immediately with vulvectomy. We have attempted to stain spirochetes in several instances without finding any.

Dr. Willard R. Cooke, Galveston, Tex.—Our experience has been identical with that of Dr. TeLinde in cases of pseudo-elephantiasis, except that in the majority of our cases the Wassermann has been negative. It is possible in some instances that the lesion may have been luetic in origin, but the actual pathologic process is the result of chronic tissue infection and obstructive lymphangitis. We have never found any satisfactory treatment other than vulvectomy. We have never seen the slightest beneficial result from antiluetic treatment.

Dr. Burch (closing).—We have never been able to demonstrate spirochetes by Levaditi's method. Sterile bits of tissue have been injected into the testicles of rabbits, but no luetic infections have resulted. No advanced case has ever responded to antiluetic treatment, though early cases occasionally do respond. In refractory cases surgery is the only method of treatment. Sepsis is the great danger and this can be much lessened by careful preoperative cleansing of the parts. This usually requires some little time in the hospital before operation.

REPAIR OF OLD LACERATIONS AT THE TIME OF DELIVERY*

By W. T. PRIDE, M.D.,
Memphis, Tenn.

Since obstetrics is on the verge of entering a field of fundamental facts, scientific in nature, it behooves us to attempt to bring it to the highest plane of surgical endeavor. This can be accomplished only by endless toil and bold decisions.

Some few years ago, with much timidity, I began repairing an occasional case (rather badly lacerated from previous childbirth) at the time of delivery. Results were so pleasing that many cases were added to this small number, and today I do not hesitate to tell the patient of the good results that we may expect. Modern obstetrics should include prenatal care, a satisfactory delivery and postnatal directions. We have by diet and a well regulated hygiene almost eliminated the primary ills of pregnancy and are fast improving the postnatal ills, but, except in isolated cases, surgery at birth has been neglected. This is due no doubt to two misleading beliefs: first, that an obstetrician is not a surgeon; second, that anyone can deliver a baby. With these beliefs the surgeon and general practitioner have been in perfect accord, for the former wished to do all the operating and the latter deliver the children.

In the General Hospital at Memphis, one of the obstetricians began the routine repairing of old lacerations at the time of delivery of charity cases. He was notified by the Gynecological Department to discontinue this practice. Of course, it took a certain amount of work away from the surgeon and gynecologist, but should we not take the patient into consideration?

Here are some of the reasons for repairs of old lacerations at the time of delivery:

(1) Few patients will return for operation after confinement until great damage has already been done.

(2) There is only one anesthetic which lessens danger.

(3) Expense and time are grave items in many cases.

(4) Nervous, irritable mothers are unfit to nourish or rear children.

There are many other reasons for the procedure, but these are enough to justify it.

Dr. J. L. Bubis, of Cleveland, Ohio, has probably done more work along this line than anyone in the country, with excellent results. My experience has not been so extensive, but I am just as enthusiastic over results.

The surgical principles which insure success in repairing old lacerations at the time of delivery are the same that are concerned in repair at any time. The fundamental requirements are as follows:

(1) Hospitalize the patient.

(2) Employ strict asepsis.

(3) Give sufficient analgesia during labor to prevent exhaustion.

(4) Employ a good and careful anesthetist.

(5) Determine as nearly as possible, previous to labor, what the injury is.

(6) Know the anatomy of the parts and be able to recognize the structures.

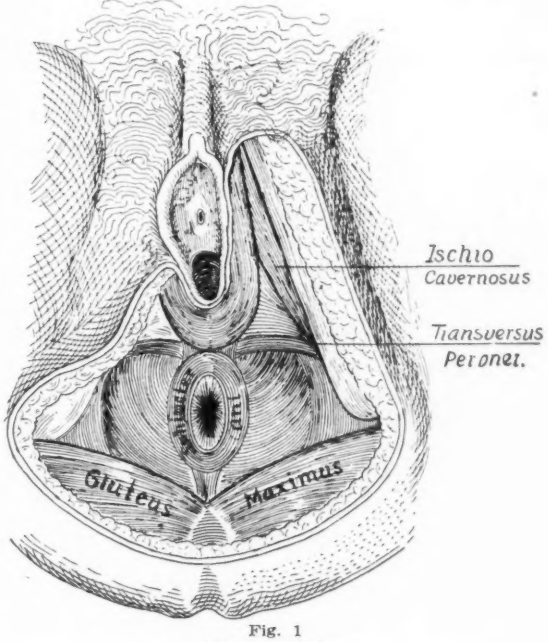

Fig. 1
Normal muscles.

*Read in Section on Obstetrics, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

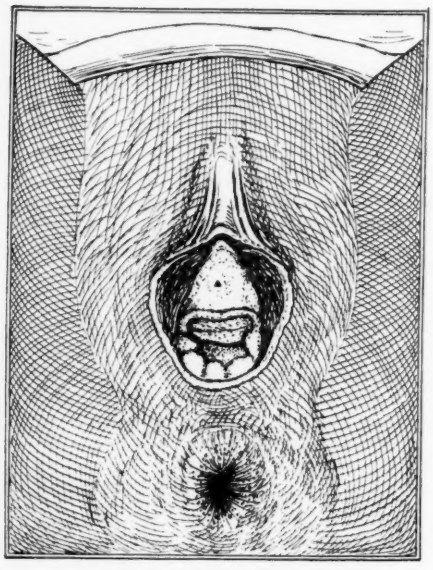

Fig. 2
Observe the relaxed condition of the perineum from an old laceration.

(7) Do not dissect with sharp instruments if it can be avoided.

(8) Do not insert too many sutures; tie them snugly, but do not constrict.

(9) Build the perineal body up with at least three layers of muscle and fascia.

(10) Finally, the result will depend upon the nursing care.

For the past two years I have consistently used 5 per cent mercurochrome two or three times daily and of course the other routine measures, and in this length of time we have had only one perineum that did not heal perfectly. In the past fifteen months I have successfully repaired all old lacerations. During this period I have delivered 445 cases in one hospital with the following results:

Old perineal lacerations repaired	50
Old cervical lacerations repaired	15
Infected and lacerated cervices, amputated	3

There have been no infections and, except for two cervical lacerations, excellent results.

I am having a few drawings inserted to show the muscles involved and the method of repairing the perineum.

It is very necessary to avoid strangulation of the tissues. Hence do not entirely surround the muscle with the suture. The deep sutures in *Fig. 3* show this very clearly. Silk worm gut is not necessary.

Again it is very necessary for the success of the operation as well as comfort of the patient, to use subcutaneous sutures to eliminate the pulling and cutting of the external skin sutures and at the same time assure a better result.

The cystocele is repaired in the usual manner. Unless this is very necessary it is not done, as it adds to the risk. The results are excellent and except for the time involved there is no reason to delay this measure.

The cervix is always repaired if badly lacerated or infected. Dr. Irving W. Potter reported 1,000 cases with good results. If the cervix should be amputated, it is done at this time. It is surprising what good results are obtained by this procedure, yet if great care is not exercised in repairing a cervix the side wall of the vagina will adhere or be included in the sutures. No doubt perfect vision and a good exposure of the parts is the secret of success. If an assistant presses the fundus downward, it will at the same time prevent hemorrhage.

If the patient is kept in the hospital for two weeks, the repair does not add to the length of

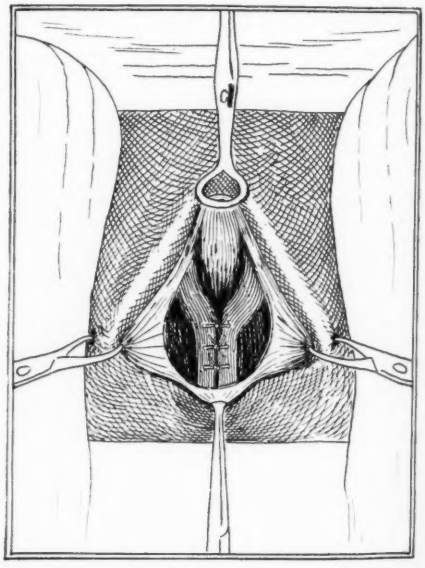

Fig. 3
Note the deep sutures are carried through and not around the muscles.

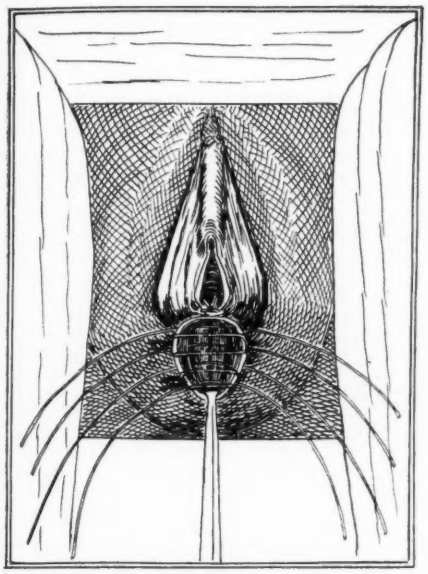

Fig. 4

Superficial sutures. There should be another row of Lambert sutures in lower edge of superficial fascia.

the stay. Many of my patients go out, after rather extensive repairs, at the end of twelve days. Of course if the cervix has been amputated and a cystocele repaired, they should not leave the hospital in less than two weeks.

In all radical procedures we should look at the other side of the case: that is, when should a repair not be done?

(1) Where infection is present or suspected.

(2) When there is excessive hemorrhage.

(3) In the presence of shock or extreme weakness.

(4) When phlebitis is apparent.

(5) In the presence of any serious organic dysfunction.

Until recently, we feared infection from the lochia, but now under good hospital care this is eliminated.

We may summarize as follows:

(1) The ideal time to repair old lacerations is at the time of delivery.

(2) Repair at this time does not add materially to the lying-in period.

(3) The patient who would not return to the hospital for repairs after delivery leaves it in good condition.

(4) The patient is saved time, money and suffering.

If repairs at delivery were routinely made, the per cent of malignancy would be materially decreased.

1460 Madison Avenue.

DISCUSSION (*Abstract*)

Dr. W. B. Anderson, Nashville, Tenn.—I am not convinced that the period of confinement is the proper time for gynecoplastic work. Drs. Pride, Bubis, Titus and Potter are fortunate because they are experts in their lines, but no one can do a Potter version like Potter. Gynecoplastic work on the puerpera is safe in the hands of men like Dr. Pride, but not with the general obstetrician. Dr. Bubis has probably done more of this work than anyone in the country. He stops at nothing in gynecological surgery on the puerpera and recognizes no contraindications except the contraindications generally spoken of in surgery; that is, shock, hemorrhage, an organic deficiency or anything that would make a long anesthetic dangerous; and he gets by with it in most of his cases, as Dr. Pride says. Dr. Titus, of Pittsburg, also is doing a good deal of gynecoplastic work on the puerpera, but he is much more conservative than Dr. Bubis. He recognizes some contraindications and limits his work mainly to lacerations of the perineum which have given the effect of rectocele. He says that all other operations should be avoided except in extreme cases. The more extreme the case the more reason I think there is for postponing the operation for a more appropriate time.

I am very much opposed, generally speaking, to any kind of gynecoplastic work during the puerperium except to repair primary damage. There is where the work ought to be done and done properly. If you will repair all primary damage done at the time of labor you will not have to send your cases to Dr. Pride or to other obstetricians to have the work done later. But if you fail to do that or if you fail to get union, what is to be gained by operating in the next confinement? A few days in the hospital is all that you can hope to gain.

If the damage is so great that it interferes with her comfort or with her ability to do her work, she will consent to a secondary operation, especially if the physician insists on it. A little insistence will put her in the hands of the gynecologist or surgeon. If the injury is not sufficient to give her some discomfort, then she is not heard from. One of the reasons for doing the primary work is to close the field against infection that might occur during the puerperium. Why, then, open up a larger field for the same condition?

A summary of the contraindications, as I see them, is: the ordeal of labor is an operation sufficient unto itself. The lochia that follows, edema of the tissues subsequent to stretching of the soft parts, and the greater liability to infection make this an inopportune time for further surgery.

Dr. Lester A. Wilson, Charleston, S. C.—Ever since Dr. Bubis reported his method of repairing old perineal lacerations at the time of a delivery, I have been using it and find that it is simple and often saves the patient a later operation. The old perineal lacerations heal better than the recent ones. So far I have not had a failure in my series of cases.

If hemorrhoids are removed at the time of delivery, the patient is often more comfortable during the lying-in period than if they are allowed to remain. However, in some instances where there is considerable prolapse of the rectum, it is best not to interfere on account of the difficulty of determining how much to remove.

Dr. C. B. Upshaw, Atlanta, Ga.—I have been interested in repair work after delivery and have had some very satisfactory results. I think one can attempt too much, however. It seems somewhat radical to attempt at this time to repair deep cervical lacerations, extensive cystoceles or to do a hemorrhoid operation. Certainly these should be attempted only by one experienced in surgery and more particularly in gynecological surgery.

I would like for Dr. Pride to tell us just when he does this work; whether he delivers the placenta before proceeding with the repair work, whether or not he has much bleeding, what form of anesthesia is used, and whether the patient is kept continuously asleep from the time of delivery or allowed to come from under the anesthetic after delivery of the placenta.

I tie my skin sutures over a pair of scissors or hemostat so that they will not be too tightly drawn, and then cut into the tissues.

Dr. T. B. Sellers, New Orleans, La.—I have had a limited experience in repairing old lacerations of the perineum, having had a total of only about 20 cases. In these cases my results have been 100 per cent good. I have not repaired the anterior vaginal wall or the cervix, because the cautery will take care of about 90 per cent of cases of endocervicitis and moderate lacerations of the cervix. To do justice to this work, it is necessary, first, that the man know the anatomy of the perineum; second, that he be a trained surgeon. I agree with the former speaker that it is important not to tie the sutures too tightly, and judgment must be used in building up the perineum, as there is danger of closing the vaginal outlet too tightly. If by chance the perineum should break down, it is a very simple matter to resuture, using a little novocaine and through and through silkworm gut sutures. Do not do this until the infection has subsided and the wound has a healthy granulating surface. Repairing the perineum at this time is not only of economic importance to the patient, but it will help the young nervous mother during the entire child-bearing period.

Dr. W. R. Cooke, Galveston, Tex.—These operations must be done in an aseptic environment. I think Dr. Pride's position is sound, provided one is capable of doing the operation properly.

Many lacerations do not show externally. The vaginal outlet may appear all right, but the laceration is inside, only the mucous membrane and the muscles being involved. A primary repair of the cervix (except in a hospital) should not be done except for very profuse hemorrhage, because of the danger of infection. Late operations for lacerations of the perineum should be repaired under some circumstances. I tell my students this:

You should know, in the first place, whether the patient has old lacerations, and if so, whether she has symptoms from them. If at the time of labor the perineum is not torn and she has no symptoms, do not repair it; but if it is torn farther or if she has had symptoms from the old lacerations, then repair them. If she is torn again by the second labor it is easy to expose the deeper tissues and repair them. With the cervix it is a difficult affair.

The most valuable aid I have found in the repair of obstetric lacerations is the use of tincture of iodine as a differential stain. If iodine be liberally applied to a field of operation, the squamous epithelia become very dark brown, the cylindrical epithelia a pinkish brown, and the raw areas remain unstained. With such a clear-cut definition it is much easier to accomplish accurate approximation.

Dr. C. D. Rollins, Jacksonville, Fla.—I should like to ask Dr. Pride what his experience has been with the repair, immediately after labor, of a complete laceration which took place at a previous labor. I have had a case which illustrates the practicability of repairing a complete tear in order to get rid of a bowel-infected vagina preliminary to elective cesarean section. The case also illustrates the fact that it may be impossible to deliver a live baby *per vaginam* at the first confinement, and quite possible at the second confinement. The patient in a preceding hard labor had been badly torn, had never been able to control her bowel movements since. Vaginal examination revealed a complete laceration, the tear running up beyond the bowel sphincter. I determined to elect a cesarean delivery, and fourteen days previous to the time of election I repaired the complete laceration. We got primary union, rectal sphincter control and a perfect result.

Although we did not intend it, eleven days after the operation the patient was delivered through the vagina, and of course all the repair work was torn open, involving the bowel sphincter and bowel as before. I immediately repaired it again. She left the hospital with a recto-perineal fistula of very small caliber, opening into the margin of the anus. Sphincter control was perfect. I think it is possible to obtain good results with immediate repair after labor, even in complete lacerations.

Dr. J. Raymond Graves, Miami, Fla.—In either primary or secondary repair of the perineum, we should make every effort to approximate the muscles and fascia, so as to make a normal perineal body. We use three layers of sutures, pulled snug, but not too tight. We want the perineal body to support the posterior portion of the vagina, thereby preventing a rectocele.

We have not attempted secondary cervical repairs. We feel that most of these can be taken care of in the office. All of our patients are examined immediately after delivery and re-examined five or six weeks later. Cervical erosions, lacerations and cysts are treated at this time by linear scarring with the actual cautery.

We do not use an anesthetic in cauterizing the cervix.

We are tempted to do too much if one is used. These patients return for a secondary treatment in ten days or two weeks. They usually have an increased leucorrheal discharge after cauterization.

We believe we can get better results in cervical injuries five to six weeks post partum than immediately post partum, unless the tear is so deep that sutures are required to control hemorrhage.

Dr. Pride (closing).—We always have gas for delivery. We deliver the placenta and allow the patient to rest a while, to see that there is no bleeding. Then the gas is again given for the repair, even if the laceration is very mild. Hemorrhage under continuous anesthesia does occur sometimes, and the only way you can stop the hemorrhage is to stop the anesthetic. Especially

since we have used ethylene do we find sometimes that the patients bleed a little more than with nitrous oxide and oxygen.

I classify lacerations as first, second, third degree and complete. Complete means everything through the rectum; third degree goes through the sphincter; second into the muscle, and first degree through only the mucous membranes.

About three months ago I had a case of complete laceration of six and one-half years' standing (being attended at that time by a prominent surgeon). This woman had a difficult delivery and a complete laceration which was repaired at the time with a good result except that she had had a recto-vaginal fistula for six and one-half years. When I dissected the rectum away from the vaginal attachments I found, instead of a place about the size of a pea, one that you could put a golf ball through. To our surprise, we got a perfect result. I doubt that I would have gotten a perfect result with an elective repair.

You cannot always tell whether the cervix is lacerated or not. A year or two ago I obtained a Levy's cervical speculum, which is one of the best instruments I possess It is the only thing that will expose the cervix so that you can see it properly. In the last fifteen months, in 445 cases, I have used this speculum with good results.

CHRONIC ULCERATIVE COLITIS: ETIOLOGY*

By Roy R. Kracke, M.D.,
Emory University, Ga.

Chronic ulcerative colitis was first described as a clinical entity in 1875 by Wilks and Moxon.[1] Prior to that time it was regarded as one of the end results of infection in other diseases. Various writers have given this condition different names, such as idiopathic ulcerative colitis, non-specific ulcerative colitis, asylum dysentery, innominate ulcerative colitis and chronic ulcerative colitis. From a review of the conditions described, it is evident that all were dealing with the same condition that is now referred to as chronic ulcerative colitis, non-specific in origin, and in which the bacillus of dysentery or *Endameba histolytica* cannot be demonstrated.

Chronic ulcerative colitis is a disease involving the large intestine and until recently it was a disease of unknown etiology. It is quite possible that the name of the disease may ultimately be changed to one descriptive of the infection along the entire intestinal tract, as evidence is accumulating to indicate that its activity is not confined solely to the colon, but may occur in various portions of the small intestines. Such a case has recently been reported by Roberts.[2]

The condition is characterized clinically by diarrhea, either continuous or intermittent, and as many as twenty to thirty stools daily may be passed. These stools always contain the pathological triad of feces, that is, blood, mucus and pus, and frequently consist almost entirely of this material.

It is also a disease characterized by remissions and recurrences, and this important feature should be considered in evaluating the results of therapy. Varying with the severity, the condition may grow progressively worse to debility and emaciation, with progressive anemia and irregular periods of pyrexia. Death from the condition is not at all infrequent.

Pathologically, it is characterized by a primary invasion of the mucosa of the lower colon, with edema and hyperemia in the earlier stages, with the subsequent formation of miliary abscesses, followed by petechial ulcers and pock-like scarring. This pock-like scarring, seen after healing has occurred, is referred to by Buie[3] as the "footprints" of the disease and is described by him as being the single most important diagnostic feature. Buie has also given a thorough description of the lesions as seen with

Fig. 1

Rabbit on left has received five daily injections of a bouillon culture of Bargen's diplococcus. At this time the animal was passing soft, mucoid, bloody stools. Autopsy showed minute hemorrhages of colon. Rabbit on right received same doses of heated culture.

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*From the Department of Bacteriology, School of Medicine, Emory University, Emory University, Georgia.

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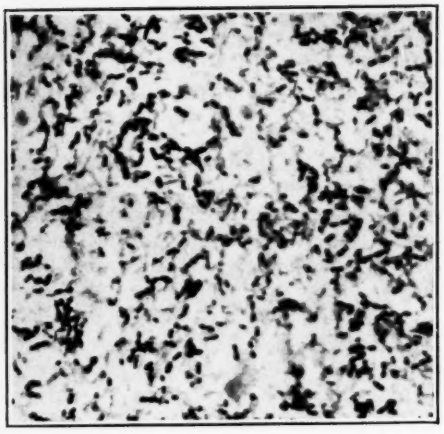

Fig. 2
Gram's stain on stool containing blood, mucus and pus. Large Gram-positive diplococci predominate. Rabbit in Fig. 1 inoculated with this organism. x1000.

the proctoscope and divides the pathological processes into four stages, as follows:

(1) A diffuse hyperemia affecting the mucosa of the bowel more markedly near the anus and lower rectum, the upper portion fading gradually into normal mucous membrane.

(2) The second stage manifests itself as edema of the mucous membrane with thickening and hyperemia. At this stage the slightest trauma will provoke bleeding and perhaps break the mucous membrane.

(3) The most significant stage from a diagnostic point of view is characterized by the formation of diffuse miliary abscesses, averaging 1 mm. in diameter.

(4) After the rupture of the abscesses, this stage is characterized by minute, discrete, bleeding, miliary ulcers, which may be interspersed with small scattered pock-like scars, indicating healed ulcers of a previous attack. This picture is considered characteristic of the disease.

ETIOLOGY

Little was known about the etiology of the condition until 1925, when Bargen and Logan[4] first published their description of the organism that bears their name. Before this time many writers have considered various bacteria as the etiological agent. Bassler,[5] in 1913, gave the colon bacillus as the cause, and in 1927 he[6] stated that it was probably a hemolytic streptococcus. Streptococci have been thought to be the cause by other writers. Yeomans,[7] Brown,[8] Wallis,[9] Einhorn[10] and Thorlakson[11] have considered the dysentery bacillus responsible. Hewes[12] has advanced the idea that the condition may follow any state of lowered resistance and the etiology may be non-specific, while Yeomans[13] believes the lowered resistance is followed by invasion of the mucosa by the organisms of the gastro-intestinal tract, which under normal conditions are non-pathogenic. However, none of the above theories has been supported by extensive investigative work.

Bargen and Logan,[4] in their original publication, and in subsequent articles,[14 15 16 18] have described the consistent isolation of an organism from the mucoid, bloody stools and bases of ulcers in this condition.

The organism is described as a large, Gram-positive, lancet-shaped diplococcus which has no capsule, grows aerobically on ordinary culture media, produces an alpha-hemolytic colony on blood agar, is not bile soluble, does not ferment inulin or mannite, is not agglutinated by pneumococcus antisera, and produces antibodies in rabbits which agglutinate other strains, and is considered therefore to be biologically specific. The freshly isolated strain always ferments lactose. It will be seen that this organism is similar in morphology to the pneumococcus, but differs culturally in many respects. A table of differentiation follows:

PNEUMOCOCCUS	BARGEN'S DIPLOCOCCUS
(1) Gram-positive lancet-shaped diplococcus.	(1) Gram-positive lancet-shaped *large* diplococcus.
(2) Does not grow on ordinary media.	(2) Grows well on ordinary media.
(3) Colonies on blood agar flat, green-tinged and wet.	(3) Colonies on blood agar raised, rounded, pearl gray, alpha-hemolytic.
(4) Soluble in bile.	(4) Not soluble in bile.
(5) Ferments inulin.	(5) Does not ferment inulin.
(6) Does not ferment lactose.	(6) Ferments lactose.
(7) More than three biological strains.	(7) One biological strain.
(8) Does not produce ulcerative colitis in animals.	(8) Does produce ulcerative colitis in animals (60 per cent).

Bargen's technic for the isolation of the organism is as follows: The colon is first thoroughly cleansed by repeated washings, a proctoscope is introduced, and an area selected showing a typical ulcer. The ulcer is wiped with a sterile swab, this is discarded, and a second swab carefully introduced into the base. The material obtained is immediately introduced into warm dextrose brain broth, blood agar plates and lactose agar plates. At the end of six hours subcultures from the brain broth are made to blood agar plates. At the end of 24 hours, typical colonies are selected, the organism recovered in pure culture, identified, and vaccines prepared. Great stress is laid on the importance of exactly following this technic. However, I find that the organism is easily isolated, not only in this manner, but from the stools of these cases. Instead of following Bargen's technic, I believe I obtain equal results by inoculating my blood culture medium[17] since it is very similar in

Fig. 3
Pure culture of Bargen's diplococcus in dextrose bouillon. x1000.

composition to the dextrose brain broth described by Rosenow, subculturing to blood agar plates in 24 hours, and identifying in the manner described.

Close examination of the stools is very important, since it is desirable to obtain a portion of mucus or pus. These portions can be selected from some stools only after a very close gross examination, and due to the unpleasant olfactory sensation, this is often neglected in routine examinations of stools.

Bargen[18] reports the isolation and frequent predominance of this organism in 80 per cent of his cases, which numbered about 200 in 1928. He has injected the various strains in 459 rabbits, reproducing the disease in 268, or 58 per cent. He cultured 98 normal colons and isolated the organism in 16 instances, of which four strains produced colonic ulcers in rabbits. He also reported five instances of blood stream infection. Crohn and Schwartzman[19] report blood stream infection in three cases.

Using the various strains he has prepared a serum for use in severe cases, the value of which is questionable, but he[16] reports its use in seven severe cases. Two of these were greatly improved, three were benefited and two died following ileostomy.

He has prepared vaccines from many of his strains and reports a high degree of success using this form of treatment. The vaccine is prepared by rapidly isolating the organism in pure culture, and preparing a suspension of two billion organisms per c. c. He states that it is the most valuable form of therapy in this condition. Greenbaum[20] reports a severe case cured by vaccine therapy. Horgan[21] reports five severe cases cured, and MacNaughton[22] reports decided improvement in five cases. Soper,[23] in an excellent article, states that he isolated the organism in each case of sixteen cases, but that vaccine therapy failed to show striking results. He concludes that Bargen's organism is the etiological factor of chronic ulcerative colitis. In a recent report, Fradkin and Gray[24] studied 15 cases, isolated the organism from twelve, with ten showing remarkable improvement after vaccine therapy. They accept the organism as being the etiological agent.

In an excellent article, Paulson[25] reports his efforts to confirm Bargen's work and isolated bacteria from 14 cases, obtaining ten types of streptococci. These were injected into 34 rabbits, producing colonic lesions in 14, while in 20 rabbits injected with other bacteria, colonic lesions were produced in twelve. He was unable to confirm Bargen's work and states that the etiology is as yet undiscovered. He brought out the fact that Torrey had isolated the organism from normal feces and that Denny and Frobisher found it in four nephritic throats.

During the past few months I have endeavored to isolate this organism from the bloody and mucoid stools examined in Wesley Memorial Hospital, and have isolated and identified the organism in ten cases, all of which showed blood, mucus and pus in the stools.

Six of these cases, however, showed no symptoms of ulcerative colitis, and four were believed to be typical cases. Even though no symptoms of this disease were present in six cases, it is believed that the presence of blood, mucus and pus in any stool is sufficient evidence to warrant the assumption of some type of gastro-intestinal disease.

Five of these strains have been inoculated into rabbits. In only one did symptoms of ulcerative colitis appear. All five developed soft, mushy stools, but lesions of the intestinal tract were produced in only one. All of these ani-

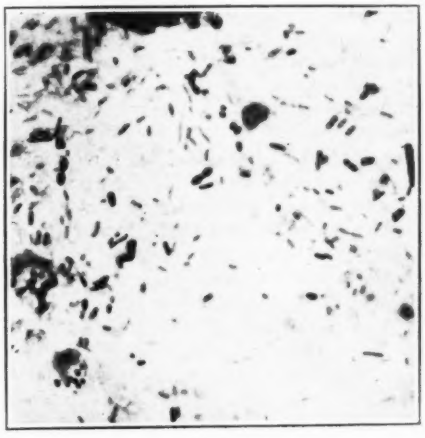

Fig. 4
Smear of mucoid particle of feces showing large Gram-positive, elongated diplococci. Large diplococcus in center illustrates morphology. This patient had no symptoms of ulcerative colitis, but stool contained blood, mucus and pus.

mals were on an ordinary diet. Bargen states that they should be prepared by feeding on a vitamin-free diet for two weeks to produce a lowered resistance. The rabbits were inoculated intravenously with increasing doses daily of the organism in bouillon culture. The heated culture of each strain was injected into a control.

Figure 1 shows two rabbits, the left being the test rabbit and the right the control. This photograph was made after five daily injections. At this time the rabbit was passing watery stools with blood and mucus. Autopsy showed minute hemorrhagic lesions of the lower colon.

Figure 2 shows a direct smear of the mucoid stool stained with Gram's stain, in which the Gram-positive diplococci predominate.

Figure 3 is the same organism grown in pure culture after isolation.

I have not been able to isolate this organism from a stool that does not contain blood, mucus and pus, and this indicates its etiological relationship in the production of gastro-intestinal disease.

TREATMENT

Since Bargen's work, all writers seem to be in accord that treatment should be directed along both specific and general lines. Buie[3] summarizes the most rational form of treatment as follows:

(1) Eradication of foci, as infected teeth, sinuses and tonsils.

(2) A high caloric and low residue diet.

(3) Specific treatment with a vaccine prepared from the organism isolated from the patient.

(4) Local medication to the ulcerated area.

(5) Ileostomy only as an emergency measure in extreme cases.

Repeated small transfusions are recommended by some. Many lay stress on the fact that hospitalization, bed rest, proper diet, will, in most cases, produce an apparent spontaneous recovery, and therefore we should guard against over enthusiasm for any particular line of therapy in a disease characterized by remissions. This is well illustrated by Dr. Frank Smithies'[26] discussion of Dr. Bargen's paper on this subject at the 1928 meeting of the American Medical Association. Dr. Smithies said:

"I believe that I can describe a series of patients in whom the results of treatment without the employment of specific vaccines have been just as satisfactory as were those which Dr. Bargen presented here today, and included in my series are some which he and his associates have had under their care. I cannot subscribe to Dr. Bargen's point of view. His vaccine has a place, but it cannot be classed as a specific curative agent for chronic ulcerative colitis."

SUMMARY AND CONCLUSIONS

(1) Bargen's diplococcus of ulcerative colitis has been almost universally received as the etiological agent of this disease.

(2) No one as yet seems to have done a sufficient amount of investigative work on this disease to contradict the positive findings of one who has.

(3) I have not been able to isolate the organism from any stool that does not contain blood, mucus and pus, indicating a causal relationship.

(4) There is need for a more thorough gross and bacteriological examination of stools than is commonly done.

(5) The administration of vaccines prepared from this organism has been attended with excellent results.

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THE PUNCH OPERATION: PRESENTATION OF A NEW METHOD OF FIXATION OF THE VESICAL ORIFICE*

By DAVID M. DAVIS, M.D.,
Baltimore, Md.

The punch instrument was designed by its inventor, Dr. Hugh H. Young, for the removal of small obstructive bars and lobes at the vesical orifice in such a manner as to avoid a major cutting operation on the bladder. It cannot be used successfully in any case where the obstructing mass is too large to enter the notch of the punch instrument, or, differently expressed, when the removal of such tissue as will enter the notch of the instrument will not cure the obstruction. This limitation is very definite and means that the operation is suitable only for a small minority of prostatic obstructions.

Keeping this in mind, it is evident that there are then three requirements for success with the punch. They are, first, selection of suitable cases; second, removal of a large enough piece from the right place; and third, a reliable method of hemostasis which will prevent slough, infection and secondary hemorrhage.

SELECTION OF CASES

Experience has shown that three types of cases are suitable for the punch operation. They are (1) cases of true median bar formation, with a rounded bar or dam extending across the posterior portion of the vesical orifice. There may be slight clefts or concavities where the bar meets the lateral edges of the vesical orifice, but its upper surface is straight across, not rounded. On depressing the handle of the cystoscope, the bar hides part or all of the trigone. Examination with the finger in the rectum and cystoscope in the urethra usually shows a transverse collar of induration beneath the vesical orifice and allows one to make absolutely sure that there is no lateral enlargement of the prostate. Only the inexperienced will mistake an hypertrophied interureteric bar for a median bar.

(2) In cases of contracture of the vesical orifice, the cystoscope is tightly grasped. The edge of the orifice is sharp and irregular. The collar of induration is usually present. In most cases the contracture is circumferential, but in a few the scar tissue is mostly anterior, and the posterior edge is level with the trigone. In such cases an anterior cut must be made.

(3) In cases of small median prostatic lobes, the problem is to make sure that the lobe is small enough to enter the notch of the punch and that there is no lateral hypertrophy. In these cases the collar of induration may be lacking.

Some cases of carcinoma of the prostate may be relieved by the punch operation, provided they meet certain requirements. The obstructing mass or contracture must be able to enter the notch. Sometimes, unfortunately, involvements having the cystoscopic appearance of contracture of the vesical orifice extend so far down the prostatic urethra that the punch is unable to take hold of them.

The recognition of suitable cases has been made possible by the work of Young, Cecil, Randall, Caulk and others. Having selected the case, it is necessary to remove enough tissue to relieve the obstruction.

REMOVAL OF TISSUE

The size of the urethra limits the size of the punch instrument. As a result, it sometimes fits rather loosely in the vesical orifice, particularly in bar or lobe cases. When the knife is pushed home the sloping surface of the mass causes it to spring outward, so that only a small portion of it is cut off, or perhaps merely a strip of mucosa is removed. To overcome this difficulty, I imagined a bar or fin on the principle of the Otis dilating urethrotome which would push the notch down firmly over the obstructing mass. A few experiments showed that the end could be attained much more easily by lengthening the beak of the punch and stringing a flat wire from its tip to a point about half way back

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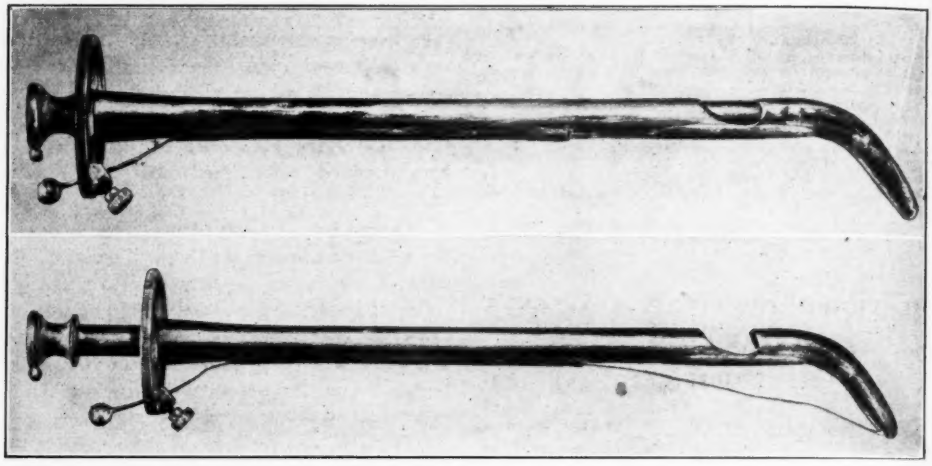

Fig. 1 (Top)—New Davis punch instrument, closed for introduction.
Fig. 2 (Bottom)—New Davis punch instrument, obturator withdrawn, wire straightened to fix, vesical orifice.

along the shaft of the instrument (*Fig. 1*). This wire lies flat along the concave surface of the instrument during insertion, and after the notch is engaged in the vesical orifice, can be straightened by pulling on its outer end. When this is done, a piece exactly as large as the punch instrument is always removed, and this one piece usually suffices.

Before straightening the wire one should, of course, make sure by rotating the punch instrument that the trigone is not engaged and that the instrument has not engaged the external sphincter or triangular ligament by pushing it in a trifle, when, if it is at the orifice, fluid from the bladder should at once flow through it.

The diagram (*Fig. 3*) illustrates graphically the degree to which the orifice may be enlarged. The circle to the left represents the size of the instrument when closed. Its diameter is 10.34 mm., its circumference 32.5 mm. If the orifice is smaller than this, it is dilated before the instrument is inserted. The wire is then straightened as much as the orifice will allow. When stretched to its maximum, it will fill an orifice 41 mm. in circumference, equivalent to a diameter of 13.36 mm., pulling it out into a triangular form (second row in the diagram). After making the cut, the circumference of the orifice is increased to 52.5 mm., equivalent to a diameter of 16.7 mm. If the orifice at the beginning is less than 41 mm. in circumference, two cuts will be necessary, straightening the wire anew between the cuts, but a maximum diameter of 16.7 mm. can always be attained.

While the cut is being made, the wire is held taut by a set screw, and after it is completed, the set screw is loosened and the wire pushed in before moving the instrument about.

HEMOSTASIS

There is usually brisk bleeding from the cut surface, particularly if lateral cuts have been made. The new instrument, by obviating the

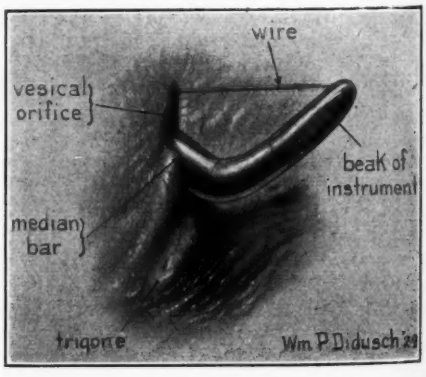

Fig. 3

New Davis punch instrument. View from within bladder, showing wire pulling orifice up in triangular shape, fixing notch firmly over median bar so that it cannot escape.

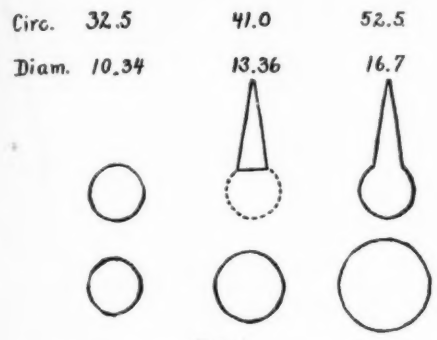

Fig. 4

Diagram illustrating extent to which orifice can be enlarged. A, size of instrument as inserted; B, with wire fully extended, instrument fills an orifice equivalent to a circle with a diameter of 13.36 mm.; C, after cut is made, orifice is equivalent to a circle with a diameter of 16.7 mm.

necessity for lateral cuts in many cases, diminishes the bleeding, but it is still a factor to be reckoned with. Various methods of dealing with it have been devised. After testing them, I have concluded that all cautery methods are unsatisfactory because of infectious complications, secondary hemorrhages, and late contractures due to the extensive eschar. The method of electro-coagulation of the individual bleeding point under vision as suggested by Hinman years ago fulfills all requirements and has a minimum of disadvantages and dangers.

To do this, one inserts a urethroscope, cystourethroscope or convex cystoscope immediately after withdrawing the punch. Braasch uses his direct vision cystocope. If the lens is placed opposite the cut surface and a little irrigating fluid allowed to flow in, the field is cleared, and one can see the streams of blood coming from cut vessels.

Each one is touched with a fine pointed electrode and the bleeding stopped by coagulating a very small area around it. One can see that the hemostasis is complete, no catheter is required and there need be no further care about the patient's welfare. This takes a little time, it is true, but the results more than justify it.

The best known other methods which have been put forward are the Caulk, the Collings, and the Stern. In the Caulk punch, the cutting blade either cauterizes or coagulates the entire cut surface while the cut is being made. Collings and Stern use the cutting current, the first using a curved electrode and the second a loop electrode. The Caulk method has been very successful, but cauterizes the entire surface and may occasionally give rise to secondary troubles. With the Collings and Stern methods any amount of tissue may be cut away. There is sometimes bleeding, so that it may be necessary to use electro-coagulation or some other method to control it. The wire for pulling the margin of the orifice into the notch of the instrument has not been used on any of these models, but is here presented for the first time.

RESULTS

I have used the method of hemostasis by coagulation of individual bleeding points for three years with the most complete satisfaction. During this period there has been but one secondary hemorrhage, occurring on the fourth day. This hemorrhage came from a single vessel and was stopped immediately by inserting the cystoscope, finding the bleeding point and coagulating it again. The number of cases has been about 40. The punch instrument here presented has been used in a smaller number of cases, as it is quite new, but in every case it has functioned perfectly, allowing very large pieces to be removed. In my opinion it constitutes a most important improvement to the punch operation, increasing markedly the reliability and effectiveness of the procedure. Convalescences have been uneventful, and marked particularly by the absence of fever and pain.

CONCLUSIONS

The objects of this paper are two: first, to present a new instrument; and second, to give evidence that the punch operation, properly performed on suitable cases, is very satisfactory and very safe. No mechanical device can ever take the place of skill and good judgment, but if these qualities are present, the method I have described will give results which cannot be excelled.

DISCUSSION (*Abstract*)

Dr. James Leonidas Estes, Tampa, Fla.—This punch instrument has distinct advantages over the original instrument. With it more and more selected cases of bladder neck obstructions will be relieved.

Dr. T. M. Davis, Greenville, S. C.—We all know that Young's instrument and punch operation were notable advances in the management of certain cases of vesical neck obstruction. Since the introduction of several instruments permitting accurate observation during operative procedures the punch instrument is as obsolete for removing obstructions at the vesical neck

as the Kelly cystoscope is for doing accurate cystoscopies.

The Stern's resectoscope for resecting vesical obsrtuction permits visualization during the operation as does the cystoscope during cystoscopy. During resection the loop of the instrument is always under accurate observation and control. You observe what you are removing, the gutter formed when the tissue is resected, and the presence or absence of hemorrhage may be definitely determined. Hemorrhage is easily controlled by imposing a diathermy current through the loop without changing the instrument through a special switch I designed since presenting my paper before this Section last year. The loops have also been improved to withstand this type of current.

There has been only one case of secondary hemorrhage in my series of 93 cases resected. This occurred on the tenth day after resection and was easily controlled by coagulation. I find that in the anterior part of the urethra it is most difficult to control hemorrhage, as the fenestrum of the instrument is upwards. For this reason I always leave the anterior sections until the last in extensive resections.

I have not used prostatectomy in three years, as I have been relieving all obstructions with resections by using the Stern's instrument. This may be wrong in the true adenomas. I believe that true adenomas occur in a small percentage of all obstructions. I have checked the residual urine and infections in most cases and the results compare as favorably as do cases previously treated with radical prostatectomy.

I am firmly convinced that in malignant conditions resection is the operation of choice by far. I have seen cases in which radical operations had been done by some of the best operators in the country. I have never attempted a radical operation, resecting the neck of the bladder joining the neck to the urethra. I think it is a mutilating operation. Every case observed had incontinence of urine and terminated fatally with carcinomatosis within eighteen months after operation.

In my series of 93 cases there were 23 malignant ones. All are still living and free from obstruction. I use sacral anesthesia entirely.

Dr. Davis (closing).—Dr. T. M. Davis has made a great improvement in the resectoscope which has converted it from an instrument which was quite impractical into a practical instrument; and it may be that his manner of using it will come into much wider acceptance in the future. Just how far it can be used in the treatment of large lateral lobes must remain to be seen a few years hence. The resectoscope is rather expensive, and it takes a good deal of time. The punch operation in properly selected cases saves time, the instrument seldom gets out of order, and if it does is easily repaired.

I think he has exaggerated the post operative troubles of those who have had the radical operation for carcinoma of the prostate. A few of them suffer from incontinence of urine, but I think in every case this has been due to infectious complications appearing after the operation and leading to improper healing. I have seen many cases, however, in which the radical operation had been done where the patients were in perfect health and had perfect control of their urine many years after the operation.

DIVERTICULUM OF THE URETER*

By WILMER L. GRANTHAM, M.D.,
Asheville, N. C.

A careful review of all available literature would lead one to think that diverticulum of the ureter is very rarely found.

Dr. John H. Neff, of the University of Virginia, reported one case before the Section on Urology at the Southern Medical Association, Fourteenth Annual Meeting, in Louisville, Kentucky, November 15, 1920. Dr. Neff's case was that of a man thirty-two years of age, giving a history of frequent attacks of renal colic. Some of these attacks were very mild, while others were extremely severe, some being severe enough to require morphine for relief. In none of these attacks was there any history of chills, elevation of temperature, hematuria or passing of calculus. X-ray plates of the genito-urinary tract were reported clear, and repeated urinalyses showed neither blood nor pus.

The cystoscopic appearance of the bladder was normal. A catheter passed into the right ureter met an obstruction about 10 cm. above the bladder, which was passed after considerable manipulation. There was another obstruction about 6 cm. (further up the ureter). Both of these obstructions were overcome. In making a differential function test with phenolsulphonphthalein, he found that there was no delay or difference in the output from either side. An x-ray picture showed the right catheter in place, making a complete loop on itself at the level of the lower portion of the sacro-iliac joint. A pyelogram of the right side was made, after injection of 60 c. c. of thorium solution, which showed a marked hydronephrosis, a general "S" shaped curve of the ureter just below the level of the pelvis, and dilatation of the ureter down to the level of the lower portion of the sacro-iliac joint, at which point there was a *culdesac* formation on each side of the duct. Urine from this kidney was collected and contained no pus. The case came to operation and the diverticulum was removed with relief of all symptoms.

A. R. Stevens reviewed the literature and reported a case before the American Association of Genito-Urinary Surgeons, in 1926. Stevens at that time found two clinical cases reported, one of these being the one I have just mentioned of Dr. Neff's. The other was reported by Hale. A small diverticulum was located about 10 cm. above the bladder in a man twenty-seven years of age, who had suffered with pain in the abdomen on the corresponding side for a period of seven years. This sac was also removed with relief of symptoms. Stevens also mentions another case, first seen by Crowell, operated upon at a later date by Dr. Hunner, and reported to him.

He found, also, three other cases which were reported at autopsy, this making a total of four cases which had been diagnosed and operated upon, and three which were found at autopsy.

Stevens' case was a man, age fifty-nine, admitted to the hospital with a history of acute pain in the lower abdomen, accompanied by chills and fever. It was

*Read in Section on Urology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

found at operation that the kidney was completely riddled with small cortical abscesses. The kidney and upper ureter were removed, and two small diverticula were found at the kidney pelvis. The patient made a good recovery. Lichtenberg and Marcella also reported a case, the patient being a man thirty years of age, complaining of painful and frequent urination, with cloudy urine containing an abundance of pus. There was a diverticulum at the lower end of the left ureter. The right ureter was normal. At operation, the lower part of the ureter and sac were cut and the ureter transplanted into the bladder at the original site. Recovery was complete.

In 1926, Nikolie reported a case of a woman, age 34, who was brought to the hospital for operation for carcinoma of the uterus. On cystoscopy and ureteropyelography, a *culdesac* 12 cm. long was observed running parallel to the spinal column. The diverticulum was found to arise at a point 10 cm. above the bladder. It was 15 cm. long.

In 1927, Pliveric reported bilateral diverticula in a girl, age 21, who had suffered with colic-like pains in the right hypochondrium, sometimes accompanied by vomiting. Appendectomy and nephrolithiasis were considered, but on cystoscopy and ureteropyelography a shadow running parallel to the ureter from the bladder to the level of the innominate line was produced. At operation it was found that the diverticulum branched off from the normal ureter at a point 2 cm. above the bladder and for a distance of 15 cm. was enveloped in a covering common to it and the ureter.

In 1927, Dr. N. P. Rathbun, of the Urological Service of the Brooklyn Hospital, reported two cases, one a case of Dr. Edward L. Keys, described in a personal communication to Dr. Rathbun. This was a patient thirty-seven years of age, who had had repeated attacks of pain in the left side. Cystoscopy showed a diverticulum immediately behind the bladder to the left of the ureteral orifice. A No. 6 catheter passed readily into the right kidney pelvis and seemed to pass into the left side, but on taking a plain x-ray picture, with catheters in place, the left catheter was found coiled up in the lower end of the ureter. The urine from the right kidney was sterile. From the left kidney it was diminished in quantity and contained pus in abundance. This case was operated upon by making a median abdominal suprapubic section. The diverticulum was exposed and excised and the ureters sutured to the edge of the bladder mucosa. The patient made a good recovery.

In Dr. Rathbun's case, a boy ten years of age, with bilateral diverticula, gave a history of frequent urination since he was two years old. The urine was purulent. On cystoscopy, the ureteral orifices appeared normal, but the ureteral catheters curled up in the diverticulum just outside of the bladder. The diagnosis of bilateral diverticula of the bladder, with ureters opening into them, was made. Later, at operation, the diverticula were shown to be from the ureters. They were excised and the ureters transplanted into the bladder with satisfactory results.

In 1929, Bernhard Vormann reported a case of a woman twenty-five years of age, with a history of indefinite abdominal symptoms since the age of thirteen. The patient had been operated upon for appendicitis and gall-bladder disease, and she had had a gastric operation and nephropexy during the preceding eight years. In March, 1928, cystoscopic examination showed a normal bladder mucosa and ureteral openings. Ureteropyelogram showed a shadow at the level of the fifth lumbar vertebra, about 5 cm. long, which, on operation, proved to be a diverticulum. This was resected and repaired with complete recovery. It was diagnosed and proved to be a ureteral diverticulum with chronic inflammatory changes, causing indefinite pains in the right side of the abdomen.

I wish to report a case which I have recently diagnosed diverticulum of the ureter, though it has not come to operation because of the fact that the general physical condition of the patient and the pathology in the opposite kidney does not warrant the risk.

The patient is a white man, aged nineteen, a clerk. He complains of pain in the left side over the bladder region, extending into the lower part of the back. There is slight frequency and cloudy urine with a very offensive odor.

The patient's father is fifty years old, living and in good health. His mother is fifty years old, living and in good health. He has three sisters and one brother, all living and in good health. There is no history of tuberculosis in the family.

The patient had the ordinary diseases of childhood. Five years previously he had an attack of chorea, for which he was in the hospital nearly three months. After he left the hospital it was nearly a year before he was able to get out of the house. He had a tonsillectomy four years previously, which seemed to improve his general condition. He attempted to go to school, but he was so nervous that his physician advised against his school work, so he took a position as clerk, and has been working fairly regularly since.

He made application for life insurance, the examiner found that he had pus and albumin in the urine, and he was declined for insurance. He then consulted me about his condition. He was first seen by me on March 5, 1929.

Physical Examination.—The patient is a fairly well nourished young man, and he does not give one the impression of being sick.

There is nothing abnormal found about the head or neck. The teeth are in fairly good repair, the tonsils have been removed and the pillars are in good condition.

There is normal vesicular breathing throughout the entire lungs.

There is a definite mitral murmur. The blood pressure is 120-70.

The left kidney is palpable, the right kidney is not palpable. No tumor masses are felt, there is no muscular rigidity, and there are no scars over the abdomen.

The external genitalia are normal. Rectal examination shows no hemorrhoidal tags. The rectal sphincter is of normal tone. The prostate is of normal size and consistency. The patient voided four ounces of cloudy urine of very offensive odor. A plain x ray of the genito-urinary tract shows no shadow in either kidney, ureter or bladder. The left kidney is enlarged.

Cystoscopy.—A No. 21 cystoscope entered the bladder with ease. There was no obstruction in the urethra. The bladder capacity was 600 c. c. The general appearance of the bladder was that of a low grade cystitis. No ulcer, diverticulum, trabecula or stone was seen. The left ureteral opening was slightly larger

Fig. 1
Shows catheter up the left ureter, looped on itself.

than normal and had a slightly pouched-out appearance. The right ureteral opening was also somewhat larger than normal. On attempting to pass a No. 6 catheter into the left ureter, an obstruction was met about 6 cm. from the ureteral orifice, but after some manipulation the catheter seemed to pass this obstruction. A No. 6 catheter passed into the right ureter without meeting any obstruction. The urine collected from the right ureter was normal, and from the left was purulent. A plain x-ray with the catheters in place showed that the left catheter had not passed up into the ureter, but had formed a loop on itself at about the level of the lower portion of the sacro-iliac joint. On making a pyelogram, 60 c. c. of sodium iodide was injected without giving any discomfort to the patient. This showed hydronephrosis and a dilated ureter throughout its course. At about the level of the lower portion of the sacro-iliac joint was a sac formation on each side of the ureter. At a later date a pyelogram was made of the right ureter. It was found to be very much dilated throughout its entire course, and a marked hydronephrosis was present.

Laboratory Reports.—May 29, 1929, the bladder urine was cloudy, acid in reaction, contained one plus albumin and no sugar. The sediment was loaded with pus. No casts were seen.

May 29, the total 'phthalein:

First hour, 240 c. c. urine secreted, 20 per cent output of dye.

Second hour, 250 c. c. urine secreted, 12.2 per cent output of dye.

Total, 490 c. c. urine secreted, 32.2 per cent output of dye.

June 1, urine from the right ureter contained 2-3 pus cells to the high powered field. Stain for tubercle bacilli was negative.

June 1, urine from the left ureter contained pus cells in abundance, bacilli infection.

June 1, 'phthalein, right ureter (appearance time six minutes):

First 15 minutes, 40 c. c. urine secreted, 7.5 per cent output of dye.

Second 15 minutes, 27 c. c. urine secreted, 1.3 per cent output of dye.

Total, 67 c. c. urine secreted, 8.8 per cent output of dye.

June 1, 'phthalein, left ureter. There was no appearance of the secretion in thirty minutes.

June 9, the blood non-protein nitrogen was 75 mg. per 100 c. c.

November 2, 1929, the bladder urine was turbid and alkaline, the specific gravity 1.010, it contained 3 plus albumin and no sugar. The sediment was a turbid mass of pus cells, with an occasional red blood cell, and four plus bacteria (motile bacilli).

November 2, the bladder urine gave a pure culture of colon bacilli. The right ureter showed no growth of bacteria.

November 2, the blood non-protein nitrogen was 70 mg. per 100 c. c.

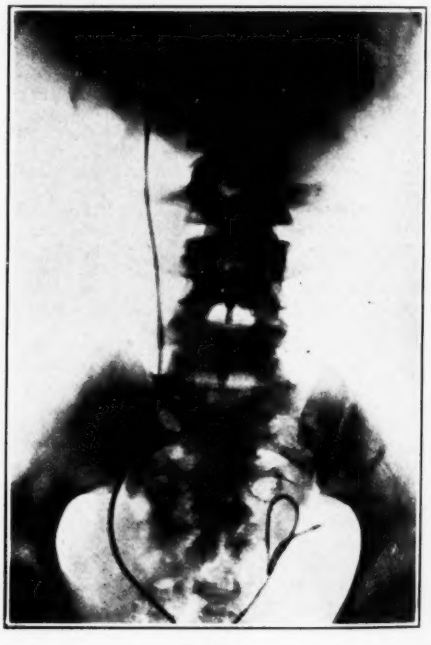

Fig. 2
Same case as Fig. 1. Picture made at another date, with coil and almost a knot tied in the catheter.

Fig. 3
Ureteropyelogram showing a large pouch just outside the bladder on each side of the ureter, with large dilated ureter and dilated kidney pelvis.

Urea nitrogen 49.5 mg. per 100 c. c.
Creatinine 2.11 mg. per 100 c. c.
Blood sedimentation time, 1 hour 35 minutes.
Blood Wassermann, negative in all degrees.

In the embryological study of the development of the urinary system, we find that the permanent urinary organs of the mammalian fetus are preceded by a set of structures which are purely embryonic in character, and which, with the exception of portions of these ducts, disappear entirely before the end of fetal life. The embryonic structures are the pro-meso and metanephros and the Wolffian and Mullerian ducts.

The permanent kidney arises in two portions, one as an invagination from the Wolffian duct, the remainder from tissue derived from the metanephros itself which forms a cap-like covering for the invagination from the Wolffian duct. This mesodermal "cap" forms the excretory portions of the permanent kidney, while that part from the Wolffian duct forms the ureter, pelvis of the kidney and collecting tubules. It is with this latter invagination from this Wolffian duct that we are especially concerned in our study of developmental anomalies of the ureter. It occurs near where the mesonephric duct, the Wolffian duct, empties into the cloaca at the site of the future anlage of the bladder. The invagination grows caudally, then cranialward with the elongation of the fetus, the original position being in the pelvis, and rising as the embryo lengthens to its permanent site.

A common anomaly of the kidney formation is the presence of two kidney pelves with the upper portion of the ureter duplicated or "cleft." In rare instances there may be two ureters on one side, distinct throughout their entirety, with two openings into the bladder. There may occur duplication of the kidney on one side.

Vormann stresses the point that we may have congenital and acquired diverticulum, that true diverticulum is always an embryonic disturbance, while an acquired diverticulum is due to inflammation and resulting injury to the tissue. He then refers to a number of cases in which acquired sacculations, similar to diverticula, developed from various causes such as incarceration of a stone, ureteral stenosis, and so forth.

Fig. 4
Ureteropyelogram of the right ureter and kidney pelvis, showing dilatation along the course of the ureter and also a dilated kidney pelvis.

SUMMARY

(1) One may say that ureteral diverticulum is a well defined pathological condition, which can be diagnosed without great difficulty by the usual diagnostic technic.

(2) The majority of writers seem agreed that diverticulum of the ureter is a congenital defect.

(3) In all cases reported, diverticula were found in the pelvis adjacent to the bladder but distinct from it, except in one case where two sacculations were found in the upper part of the ureter. In two cases the diverticula were bilateral.

(4) In the ten cases reported, there are seven males and three females, the ages ranging from ten to fifty-seven. There seem to be no symptoms or sequence of symptoms common to all cases reported.

DISCUSSION (*Abstract*)

Dr. Thos. D. Moore, Memphis, Tenn.—Diverticula, including those of the gastro-intestinal and urinary tracts, owe their existence as a rule to two factors: a congenital weakness or defect, or actually an anomalous sac formation, plus an abnormal force either extrinsic or intrinsic, more commonly the latter. The rare incidence of the disease in the ureter is very probably due to the absence of the pressure element. This, of course, is because of the low secretory pressure of the kidney and the protection from back pressure afforded by the uretero-vesical valve. Hence, it is noted that the few cases reported of true ureteral diverticula are practically all due to the persistence of an abnormal budding from the Wolffian duct in fetal life, and that the element of pressure *per se* is not an important factor.

There are two types of ureteral diverticula reported. It is open to question whether one of these types is properly so designated. The large localized dilatation of the lower ureter, without an actual sac and orifice, probably should not be considered as a diverticulum at all, but might be more properly termed a localized megalo-ureter. It is important that such a differentiation be made. The case reports so far of this rare and interesting condition indicate some confusion. I have some slides which show a large sac-like dilatation of the lower ureter which behaved like a diverticulum. The corresponding kidney was rudimentary. The patient was a lad of nineteen, who had complained of attacks of urinary frequency at intervals of six months to a year since infancy, associated with a chronic pyuria. The clinical and operative diagnosis was diverticulum of the ureter, and recovery followed its surgical removal. I am indebted to Drs. Marcus Spingarn and Joseph Johnson, of Memphis, for the privilege of presenting this case.

Dr. E. S. Gilmer, Tampa, Fla.—That ureteral diverticulum is a very rare condition is proved by the fact that few cases have been reported, that the cases found at autopsy are very few, and I do not think I have seen the condition mentioned in any text-book. The opinion is almost unanimous that it is a congenital maldevelopment. All cases reported were in the pelvic portion of the ureter except that of Dr. Stevens.

I wish to add another case that I have diagnosed as diverticulum at the uretero-pelvic juncture. The patient is a young man, age twenty-nine, who had been having repeated attacks of colicky pain in the left side referred to the left lumbar for three months, accompanied by nausea and vertigo. He had some burning on urination, but no frequency nor hematuria. He had an ichiorectal abscess nine years and a puncture wound of groin six years previously. Urinalysis was negative except for a few leucocytes. The external genitals, prostate and seminal vesicles were negative. There was tenderness in the left subcostal and lumbar areas and fist percussion over the left kidney caused considerable pain. Cystoscopic examination was negative. A pyelo-ureterogram showed a small sacculation at the uretero-pelvic juncture 0.6 cm. in diameter. The patient has had no symptoms since this examination.

Dr. A. J. Crowell, Charlotte, N. C.—We have diagnosed diverticulum or sacculation of the ureter in four cases in our clinic. One was mentioned by Dr. Grantham in his paper. This one was operated upon by Dr. Hunner, of the Hopkins. The condition was caused by straining. The patient, a trained nurse, was striving to keep a delirious patient in the hospital, who was endeavoring to escape. She experienced severe pain in her left inguinal region, which continued and was associated with frequent and painful urination until operation. The diverticulum was situated just above the bladder wall.

The second case was operated upon about two months ago. It was intra-vesical and was a large sacculation or diverticulum, markedly sclerosed at the uretero-vesical opening. The cyst, about the size of a quail egg, could be seen expanding with each ureteral movement, but the ureteral opening was so small and so situated that it was impossible to catheterize the ureters. Dr. Thompson opened the bladder and put a small catheter into the ureter, dissected, or cut away, the superfluous amount of the sac, and sutured the wound over the ureteral catheter, which was left in for two or three days. This patient made a good recovery and at the last account was feeling perfectly well. The ureter was easily catheterized just before she left the hospital.

About three or four weeks ago another unusual case came under our care. The patient had had the usual symptoms of ureteral colic for several years previously with frequent and painful urination. The x-ray picture showed a large shadow in the lower end of the ureter which at first we thought was a stone in the bladder, but on cystoscopic examination none was found. We thought possibly it was a diverticulum, but further investigation proved that the shadow was in the lower end of the ureter. A cystogram showed no regurgitation of the fluid or filling around the stone. There were ten large stones in a pocket. These were removed by Dr. Thompson, the sac dissected away and the wound closed over the ureter and drainage left in the bladder. The ureter was greatly dilated above the stones, so much so that the finger could be easily inserted full length above the bladder wall, but the uretero-vesical opening was so sclerosed that neither air nor sodium iodid would regurgitate through it. The right ureter was easily catheterized and the urine found to be normal, thus demonstrating that the great amount of pus found in the urine was coming from the left kidney. The patient is doing quite well at the present

time. It may be necessary to do a nephrectomy later. In the fourth case the sac was just above the bladder and was filled with stones, ten in all. The stones in this case undoubtedly obstructed the outflow of urine and brought about the diverticulum or sacculation. These were removed by cystoscopic manipulation and her symptoms disappeared.

Dr. Joseph H. Smith, Memphis, Tenn.—A man about twenty-eight years old came to me complaining of frequent urination and of inability completely to empty his bladder. Upon cystoscopy and x-ray examination the catheter on the right was found to be uniformly curved in several circles just beyond the vesico-ureteral arch. The curling of the catheter was so uniformly in circles that I thought surely I must have a diverticulum of the ureter. Several days later I found that I had passed the catheter into a small orifice, no larger than the ureteral orifice. Under increasing pressure I could see this orifice gradually opening or unfolding, until at the point of extreme tolerance it was seemingly large enough to admit the tip of the scope. This is a diverticulum of the bladder, exterior to the vesico-ureteral orifice. I at first thought that it was a diverticulum of the ureter.

Dr. Graham (closing).—My object in presenting this case was to get some information as to what to do for the patient. Of course, I have been handicapped on account of the condition of the opposite side. During the past four or five months I have been draining the right kidney, and have also been making attempts to drain the left one, but so far have not been successful and the condition does not improve. It is my plan to work upon the right kidney until function improves to the point where I think it will be safe to operate.

A SURGICAL SUGGESTION FOR GLAUCOMA*

By M. Earle Brown, M.D.,†
New Orleans, La.

As one approaches the threshold of ocular pathology, glaucoma challenges, resisting in a measure all of the accomplishments of our art, from the masterful contributions of von Graefe, Elliot, and many others to the present time. Confronted as we are with a problem whose primary etiology is unknown, we must endeavor to remove its physical cause which is better understood. Therefore, we shall attempt, in a measure, to review that complex structure which plays the leading role in glaucoma, the iris angle.

Fig. I (after Graefe-Saemisch) demonstrates the iris angle, which corresponds to a point 2 mm. behind the limbus, where the pectinate ligament and spaces of Fontana are found. It is the exact location of Schlemm's canal, communicating as it does with the anterior chamber through the spaces of Fontana.

Fig. II (after Fuchs'). A demonstrates the iris and ciliary body in recent congestive glaucoma. The ciliary process, c, is so greatly swollen that it pushes the root of the iris forward and presses it against the sclera, S, and the cornea, C. The sinus of the anterior chamber, which should be somewhat behind Schlemm's canal, s, is thus closed. The ciliary muscle shows the pronounced development of the circular muscular fibres (Muller's portion) characteristic of the hyperopic eye.

Fig. II-B, iris and ciliary body in old congestive glaucoma. The dotted line gives the outline of the iris, I l, and the ciliary body, c l, in the normal condition. The root of the iris is adherent to the sclera, S, and the cornea, C, wherever it has been pressed against them by the ciliary body. The attachment of the iris is hence displaced forward and lies in front of Schlemm's canal, s.

So, too, the sinus of the anterior chamber is displaced from b to a. Wherever the iris has become adherent, it has been thinned through atrophy, so that in places, b, for example, it consists of scarcely anything more than the pigment layer. Even the free portion of the iris, I, appears in consequence of its atrophy, narrower than the normal iris, I l. Over the pupillary border, e, the retinal layer of pigment turns forward farther than usual, and the sphincter pupillae, p, also shares to some extent in this eversion. The ciliary body, owing to its having become atrophic, has again separated from the iris, in fact more than in the normal condition, so that it is now removed from the iris by a broad interval. The atrophy affects both the ciliary muscle, m, and the ciliary process, c.

When attempting to correct the abnormality demonstrated in *Figs. II A* and *B,* the surgeon's technic is varied and manifold, and why? Because of the myriads of complications which each procedure presents. For that reason the following described technic demonstrated in *Fig. III* was devised. We did not dare to believe that its cure could be effected, but hoped to establish a

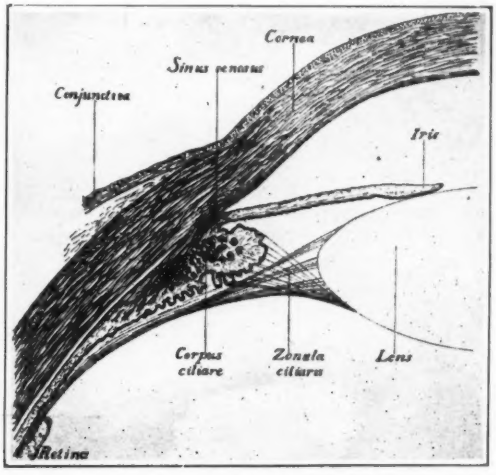

Fig. I (after Graefe-Saemisch)

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

†Chief of Clinic, Eye Department, Eye, Ear, Nose and Throat Hospital; Professor of Ophthalmology, Graduate School of Medicine, Tulane University.

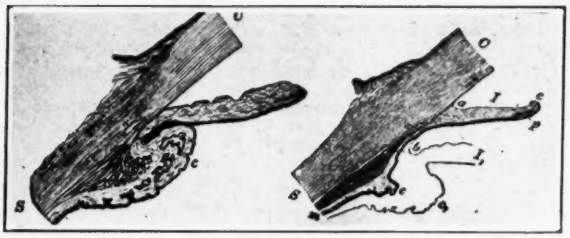

Fig. H (after Fuchs)

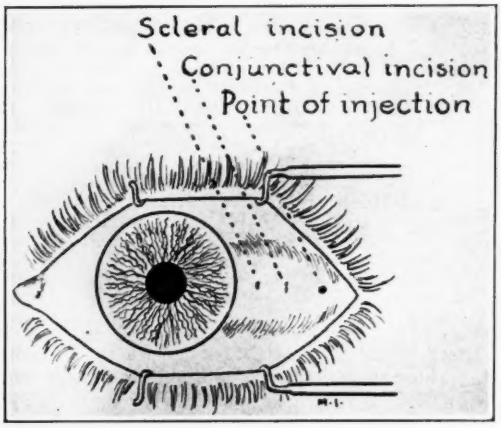

Fig. III

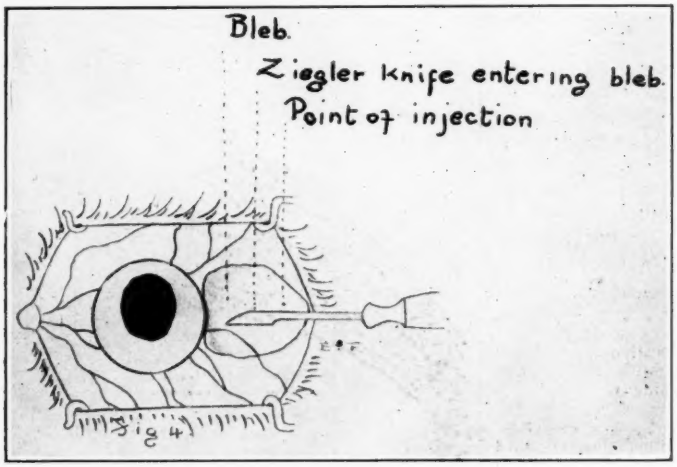

Fig. IV

method of making the patient more comfortable, thus safeguarding his vision until a more permanent operation could be performed, under more favorable conditions.

This technic was first used upon eyes that had been previously blinded from glaucoma, and was done mainly for the relief of pain. Later, it was employed in cases of acute inflammatory glaucoma during the prodromal stage and then in cases of simple glaucoma for the reduction of intra-ocular pressure. One hundred cases have been operated upon.

The conjunctiva is rendered insensitive by the instillation of a 4 per cent solution of cocaine muriate, one drop being instilled every five minutes for four doses. A speculum is inserted, the ocular conjunctiva of the temporal side is grasped with a fixation forceps and a hypodermic needle is plunged through the conjunctiva at a point 6 mm. from the corneo-scleral limbus, its point being directed toward the limbus (*Fig. III*). A solution of novocaine 2 per cent, 2 c. c., and adrenalin chloride 1-1000, minims three, is prepared and 5 or 10 minims is then injected into the subconjunctival interspace creating an oblong bleb. The bleb is punctured with a Ziegler knife needle held with the blade upon the flat surface 4 mm. from the limbus (*Fig. IV*) and it is passed subconjunctivally to a point 2 mm. from the limbus, where the sclera is punctured and the knife is plunged into the anterior chamber (*Fig V*). The blade is then rotated and slightly depressed and withdrawn sufficiently to divide the iris root. The blade is again rotated upon the flat surface and withdrawn (*Fig. VI*).

The bleb counteracts the rushing aqueous through the opening in the anterior chamber. As the fluid is

gradually absorbed, the anterior chamber does not collapse, obviously preventing a sudden reduction of tension. The tension is reduced, however, sufficiently for a steamy cornea to become transparent before the patient is removed from the table.

As the visual impairment in acute inflammatory glaucoma becomes permanent from pressure atrophy of the optic nerve, in about two weeks, surgical interference is imperative.

In simple glaucoma the tension can be controlled within the limits of safety, as the operation can be performed at the four cardinal points of the cornea, making four operations.

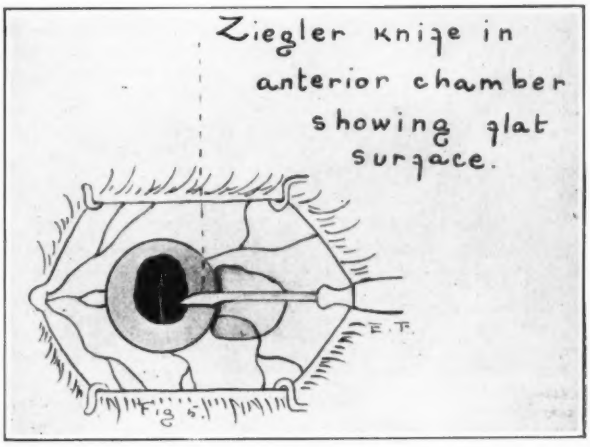

Fig. V

The following histories were selected from a group of cases operated upon because they represent the various types to which the technic is applicable.

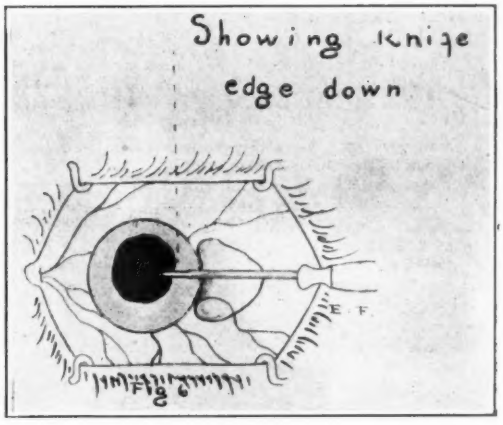

Fig. VI

CASE REPORTS

Case I.—L. S., a colored woman, age 52, married, with no children, was referred by Touro Infirmary, with a request that we enucleate the right eye, on September 10, 1927.

The family history was negative.

She had the usual diseases of early childhood. Otherwise the past history was negative.

The present illness began ten years ago, when central vision became diminished, and severe headaches were experienced. Later, the eye became painful and near vision became blurred until its final obscuration.

The right eye had been blind for one year, and painful for the past fifteen days.

Upon examination, externally, the right eye presented a marked degree of irritation. The conjunctival blood vessels were dilated, the cornea cloudy, the pupil was dilated, oval, and did not react to light. The perception of light was nil; intra-ocular tension measured 47 mm. Schiotz.

The left eye presented an apparently normal aspect, vision being recorded as 20/30. The conjunctival culture contained *Staphylococcus albus* and a Gram-positive diphtheroid on Sept. 21, 1927. Upon the same date the above described operation was performed with no complications.

August 22, 1927, the intra-ocular tension was 35 mm. The eye was less painful and presented the usual amount of injection following such operations.

August 27, the tension was 30 mm. The eye was free from pain and quiet.

August 28, the patient was discharged from the hospital with the usual instructions to return for clinical observation, which she failed to do.

May 16, 1928, contact was secured through the social service. The patient said she had been free from pain and had not bothered about returning.

June 17, 1928, when the patient was presented before the New Orleans Ophthalmological and Otolaryngological Society, both eyes were quiet and she was free from pain.

Case II.—L. H. S., a colored boy, age 6, was first seen August 12, 1929. He complained of complete loss of vision in the left eye and greatly diminished vision in the right.

He had been an inferior from birth. The usual disorders of early childhood were experienced. The present illness began at birth.

He is a poorly developed chocolate colored male child.

Externally, the left eye presents a shrunken globe, containing a cataract; the right eye presents a marked degree of exophthalmia with a bluish sclera. The cornea is large and diffusely cloudy. The iris is widely dilated. The anterior chamber is very deep. The fundus cannot be seen. Intra-ocular tension is 45 mm. Urinalysis is negative, and the blood Wassermann is negative. Miotics were administered.

August 16, 1929, tension is 41 mm.

August 18, tension is 40 mm. He is booked for an Elliot trephine on August 23.

August 23, tension is 53 mm. Due to the high tension it was considered inadvisable to perform an Elliot, and the above described operation was substituted. There were no complications.

August 26, there was a moderate reaction. Tension was minus 1.

August 27, tension was normal. There was a slight reaction. The patient was permitted to go home, miotics being prescribed.

August 30, the pupil was widely dilated, due to failure in administering miotics.

September 4, the pupil contracted to 2 mm. The cornea was clear. The eye ball seemed to have receded somewhat. Tension was normal, 20 mm.

September 11, tension was normal.

September 20, due to the weakened and thinned sclera, the iris presented into the scleral incision, showing at first a pigmented elevation. Tension was still normal.

September 25, the iris continues to herniate into the scleral incision which has become wider. There is active filtration. The eye is quiet and the tension is normal.

September 30, the parents insist upon removing the child to a distant city for economic reasons. As there was only one eye whose visual acuity is reduced to hand movements, it was considered safer to perform an iridectomy.

October 1, 1929, the eye shows some reaction. The cornea is clear, tension is normal. The patient is discharged.

Case III.—J. R., a white man, age 67, was first seen March 15, 1928. He complained of severe pain in the right eye, with visual obscuration. He had had the usual diseases common in early childhood, and had suffered from hemorrhoids for the previous ten years.

He was unmarried. There was no record of glaucoma in family.

The present illness began one hour before his admission to the Eye, Ear, Nose and Throat Hospital, when the right eye became painful, reddened and vision was greatly obscured.

The right eye presented externally a marked distention of the conjunctival vessels, the cornea was steamy and the pupil was dilated 4 mm. and oval. The fundus reflex was not perceptible. The intra-ocular tension recorded with a Schiotz instrument averaged 68 mm. The patient was operated upon immediately.

March 16, 1928, at 10 a. m., intra-ocular tension averaged 15 mm. in each eye. The eye which had been operated upon presented a clear cornea, with the usual reaction following surgery. Eserine ¼ per cent was instilled in the right eye three times a day, and once daily in the fellow eye.

March 26, the eye is quiet. Tension is normal, eserine is continued. Vision is O.D. 20/50-1:6/15:23.5 loss and O.S. 20/40:6/12:16.4 loss both eyes being unglassed.

September 14, 1928, tension is normal. Both eyes are quiet.

November 26, both eyes are quiet, and tension is normal.

March 20, 1929, O.U. plus 1.75 sphere—20/20:6/6 and with plus 2.50 sphere added for near vision—JI:35/35: 14/14.

May 31, 1929, tension is normal, vision normal and eserine is continued.

901 Canal Street.

DISCUSSION *(Abstract)*

Dr. W. R. Buffington, New Orleans, La.—Seventy-five years ago von Graefe gave us practically all we know about the relief of acute congestive glaucoma. Little has been added to the monumental observations of this great genius, though some advancement has been made in the relief of simple or chronic glaucoma.

Two theories now exist to account for the origin of intra-ocular fluid which gives to the eye its normal tension, or abnormal tension, when its function has been perverted. The first theory is that the intra-ocular fluid is a secretion; that the ciliary body, its processes and its non-pigmented epithelium is an atypical gland functioning as other glandular structures in the human body; that having entered the eye, this fluid has a slow and regular movement forward; that after having served its various purposes, about 70 per cent of it passes out of the eye through the canal of Schlemm, its normal channel of exit.

The second theory is that the intra-ocular fluid is no secretion at all, but that it is a dialysate; that the ciliary body and processes have no glandular activity; that the production of the fluid is dependent solely upon capillary blood pressure, which must be slightly higher than the intra-ocular pressure; that through the capillary walls it passes as a pure dialysate just as other fluids pass through living animal membranes; that in the normal state if the intra-ocular pressure rises higher than the capillary blood pressure, a reverse current takes place and then the dialysated fluid can and does pass back into the circulation; that the intra-ocular fluid has no movement *per se*, its movement in the eye being dependent largely on muscular action and movement of the eyeball, and that Schlemm's canal is not the regular channel of exit, but acts merely as a safety valve.

Let me make bold to state that in the future biochemistry, through the research worker, will prove which of these theories, if either, is correct, and that when the solution of this great question has been made we shall find that the cause of glaucoma is some profound endocrine dysfunction. It must be stated here that increased vascular pressure as we know it is a separate entity from capillary blood pressure. Increased or decreased blood pressure, therefore, has no direct bearing on the production of intra-ocular fluid nor on the glaucomatous state.

In the treatment of glaucoma, early diagnosis means everything. Cases of advanced glaucoma should become rare in this day of intensive specialism. In those cases of high tension irreducible by nonoperative means, operative procedure becomes imperative. Operation on an

eye with high tension has three serious complications when tension is suddenly reduced: loss of vitreous, especially in advanced cases; second, intra-ocular hemorrhage; third, minute rupture of the lens capsule with rapidly developing cataract. Any one of these three complications usually means an operative failure. Any procedure which offers a fairly safe way to lower intra-ocular tension reduces to a minimum the complications mentioned, and must be given serious consideration.

The operation just described, which is a subconjunctival peripheral sclero-iridotomy, has given very favorable results in Dr. Brown's hands. It divides the root of the iris, a thing difficult and often impossible to do in many trephines and sclero-iridectomies; and second, it produces a slow and gradual operative reduction of tension. With the tension thus reduced, one can proceed in an orderly way and select an operation which will give more permanent results, with greater safety. In many instances after operation the essayist has been able to control tension by the use of miotics.

Dr. Brown is to be congratulated upon presenting to you this rather unique, safe and effective operative procedure.

Dr. J. W. Jervey, Greenville, S. C.—I could wish that Dr. Brown had given us more of the statistics of the cases upon which he has operated, and more definite descriptions of the types of case that he uses for this new procedure. We all realize that no one procedure can be adapted to the operative interference of all cases of glaucoma. We see many cases with deep anterior chamber, particularly in the South among the negroes; then we see a great many cases with a very shallow anterior chamber. The indications for operation in these two types of cases are different. Where we have a shallow anterior chamber we are reasonably certain that we have occlusion of the iris angle, and in such a case it is necessary to remove part of the iris covering the canal. There are various procedures more or less popular designed to do that thing; but in the case of a deep anterior chamber with chronic glaucoma there is no increase in the capacity of the spaces of Fontana and the canal of Schlemm by operation because they are not occluded to begin with and all one can do is to establish drainage by a permanent filtrating cicatrix, and that can be done by various procedures.

Personally, I know that Dr. Brown has a delicate touch and a skillful hand and will not injure the lens by the procedure he describes, but I think in the hands of most of us there would be a certain proportion of injury.

I hope Dr. Brown will continue his observations and give us the benefit of them, particularly the effect on the field, which I think is quite as important a result as the reduction of tension. Personally, I would rather have 20/100 vision with a good field than 20/20 with a gun-barrel or knot-hole field.

Dr. William Thornwall Davis, Washington, D. C.—Dr. Buffington said that arterial hypertension and intra-ocular hypertension were not dependent upon one another, with which we all agree. However, I believe that arterial disease has much to do with glaucoma, particularly disease of the capillaries. If one will observe his cases of glaucoma as regards the condition of the retinal vessels he will rarely see a case of glaucoma in which there is not evidence of sclerosis of the retinal vessels. There is probably some connection between sclerosis of the retinal vessels and this increase of tension, but not necessarily arterial hypertension.

Dr. F. B. Blackmar, Columbus, Ga.—I should like to ask how long the reduced tension has remained after the operation?

Dr. William O. Martin, Jr., Atlanta, Ga.—In regard to the vascular state in glaucoma, I have recently examined the records of Dr. F. P. Calhoun's private cases and found that the average age when the patient was first seen was sixty years in a series of 500 cases of primary glaucoma. In going through the records of our cases in the Eye Clinic of Emory University, we found that a similar number showed the age to be 45. These are negro patients and the incidence of syphilis is between 35 and 40 per cent. Vascular disease is likewise high. So we find primary glaucoma coming on fifteen years earlier in these patients.

Dr. Brown (closing).—In reply to Dr. Jervey's discussion I would suggest to the men who are confronted with such patients, that they do the operation without the division of the iris root.

I do not wish to convey the idea that this technic will cure glaucoma. Therefore no field studies are reported. This operation is performed only where miotics fail, thus preparing the patient for a more permanent procedure.

TUBERCULOSIS AND UNCINARIASIS: AN ANALYSIS OF SIXTY-EIGHT CASES*

By CHARLES DEWITT COLBY, M.D.,
and
KARL SCHAFFLE, M.D.,
Asheville, N. C.

In spite of certain influences and measures of abatement, both tuberculosis and uncinariasis are more prevalent throughout the South than is generally realized. In regard to the former disease, the greatly improved economic conditions of recent years, with their attendant elevation of standards of living, should have had some effect in modifying its incidence. As to the latter, the effort of exceptionally able sanitarians, representing Federal, state and private organizations, and the expenditure of vast funds during the period of an entire generation, should have resulted in approximate eradication. While some progress has been made, the facts remain that with the exception of three of the so-called resort states of the West, the South leads the country in mortality from tuberculosis, while hookworm disease is still prevalent in all parts of the South, and among all classes of society. (Attention is invited here to the death rates of states furnished by the National Tuberculosis Association, in which the position of the Southern

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*From the William LeRoy Dunn Memorial Clinic.

RANK OF REGISTRATION STATES AS TO TUBERCULOSIS DEATH RATES

In each of the Years 1923 to 1927, Inclusive

1927		1926		1925		1924		1923	
Ariz.	324.8	Ariz.	328.5	Colo.	152.4	Colo.	163.1	Colo.	168.5
Colo.	138.9	Tenn.	147.9	Cal.	142.0	Cal.	155.1	Cal.	152.5
Cal.	135.3	Colo.	144.2	Tenn.	137.5	Tenn.	147.2	Tenn.	151.4
Tenn.	134.4	Cal.	134.8	Md.	120.8	Md.	121.4	Ky.	133.5
Ky.	109.5	Ky.	122.6	Ky.	119.3	Ky.	119.6	Md.	125.0
Miss.	102.5	Md.	113.9	La.	111.1	Del.	114.4	Va.	121.0
Md.	101.7	Miss.	109.5	Va.	109.2	La.	112.7	Del.	114.1
Va.	99.6	Del.	109.2	Miss.	107.7	Va.	112.2	La.	114.1
La.	98.2	Va.	105.3	Del.	100.4	Miss.	106.4	S. C.	105.1
Del.	93.4	La.	105.0	Ala.	100.1	N. C.	101.8	Fla.	103.4
N. C.	89.0	N. C.	97.8	N. C.	99.4	S. C.	101.1	Miss.	100.2
Ala.	87.1	Ala.	94.2	S. C.	93.8	N. Y.	94.3	R. I.	100.2
S. C.	84.0	Fla.	91.1	N. Y.	92.1			N. C.	99.3
N. Y.	82.8	S. C.	91.0	Mo.	87.2	U. S.	90.4	N. Y.	97.9
Fla.	81.1	N. Y.	89.8					Ind.	93.8
				U. S.	86.6	Mo.	89.9		
U. S.	80.8	U. S.	87.1			Ga.	88.4	U. S.	93.6
				Mass.	83.0	Fla.	86.1		
Mo.	79.4	Mo.	84.0	R. I.	82.9	N. J.	86.0	Mo.	92.5
Ark.	76.8	N. J.	83.9	Ind.	82.2	Mass.	85.6	Ga.	91.3
Mass.	75.5	Mass.	83.5	N. Y.	80.3	R. I.	84.9	Conn.	90.0
Ill.	75.3	Ind.	83.1	Fla.	79.9	Ind.	84.8	N. J.	89.7
Ind.	74.8	Vt.	80.0	Wash.	79.1	Ill.	82.0	Mass.	88.5
N. J.	74.7	Pa.	77.0	Ill.	78.1	Ohio	81.9	Pa.	85.9
W. Va.	73.5	Ohio	76.8	Pa.	77.0	Conn.	81.8	Ohio	85.8
R. I.	73.3	W. Va.	76.6	W. Va.	76.7	Pa.	81.8	Vt.	82.6
Ohio	70.2	Ill.	76.3	Ohio	74.5	Vt.	81.4	Ill.	82.1
Vt.	70.1	Conn.	76.1	Conn.	73.8	Wash.	74.7	N. H.	81.1
Pa.	70.0	Wash.	73.3	Vt.	71.2	N. H.	74.2	Me.	80.7
Me.	68.3	R. I.	72.0	Mich.	66.5	Mich.	72.9	Ore.	78.5
Wash.	67.4	Me.	70.9	N. H.	65.7	Ore.	71.0	Wash.	77.6
Mich.	65.7	N. H.	70.3	Ore.	64.9	Mont.	69.0	Minn.	73.6
Conn.	65.6	Mich.	69.4	Me.	63.2	Me.	68.3	Mich.	71.6
N. H.	64.6	Wisc.	65.2	Wisc.	61.6	Minn.	67.5	Wisc.	67.0
Wisc.	61.6	Minn.	63.0	Minn.	60.2	Wisc.	64.7	Mont.	64.6
Ore.	59.6	Ore.	61.8	Mont.	58.9	Wyo.	48.0	Iowa	44.6
Minn.	57.2	Mont.	54.2	N. D.	49.6	Idaho	45.5	Kansas	43.6
Mont.	52.2	N. D.	45.9	Kan.	44.8	N. D.	44.5	Utah	37.3
N. D.	49.0	Kan.	40.6	Iowa	42.1	Kan.	43.5	Idaho	36.6
Iowa	36.0	Iowa	37.9	Idaho	33.9	Iowa	41.6	Wyo.	36.3
Idaho	35.4	Idaho	34.5	Neb.	32.6	Utah	37.8	Neb.	34.6
Kan.	35.3	Utah	33.7	Wyo.	31.1	Neb.	35.5		
Wyo.	32.0	Neb.	32.3	Utah	29.6				
Neb.	29.2	Wyo.	26.3						
Utah	27.4								

states is seen with reference to the figures for the country as a whole).

In a personal communication, Prof. Stiles, the discoverer of the American hookworm, states that he is engaged in a compilation of statistics from the various states which will show their comparative rates of incidence of hookworm disease, up to the present time. (The last report of this kind was that of the International Health Board for 1924.) He says:

"My conclusion is that the severe cases of hookworm disease have been very greatly reduced in the South, but the moderate and light cases, and the carriers, are still very common, and will remain so for several generations. Some hookworm workers are advising the practitioners not to trouble themselves to treat light cases. It is needless to say that I do not concur with this point of view."

Possibly the influx of capital has been too recent to bring about the amelioration expected, or the sources from which both diseases arise are too deep and tortuous to be completely exposed. It would appear that in addition to the activities of the usual health and social agencies, there is an incalcuable amount of work to be done by individual physicians in earlier recognition, more thorough treatment and more consistent "follow-up" in each instance.

The two diseases are considered together in this study on account of their frequent occurrence together in the same individual and because of the common experience of finding one

masquerading under the diagnosis of the other. This was the observation of the late Dr. W. L. Dunn, whose practice was largely a consulting service, with cases referred from every Southern state and the islands of Cuba and Porto Rico. Curiously enough, in passing, it should be mentioned that of a fairly large group from the Caribbean, all were free from intestinal parasites.

With the expansion of the Dunn Clinic from the practice of its founder and his associates, the experience cited has continued and extended further, until now it is believed that an analysis of such cases may be of interest. Of 68 cases presented from the files of recent years, there were 43 in which tuberculosis and uncinariasis were found in the same patient, and 25 in which the hookworm was present, but there were no evidences of active tuberculosis. In the first group, in nearly every instance, the occurrence of the parasite had not been suspected, as the signs of its activity were so slight as to fail to attract attention, or were so merged with the symptoms of the pulmonary infection as to be overshadowed by the latter. The discovery was incidental to the practice of routinely examining the stools of every new patient. However, in a few cases, after some study, it was difficult to determine which process had priority, or which was responsible for the clinical picture. In the second group, the diagnosis of tuberculosis had been made by the majority of the referring physicians. Superficially, this was natural on account of the presence of such symptoms as progressive loss of weight and strength, anemia, digestive disturbances, even fever, dyspnea and cough. Of course, thorough physical examination, stereoscopic x-ray films, repeated sputum analyses, and possibly tuberculin tests, made elimination comparatively easy.

Taking the members of the two groups together, from the standpoint of their all being carriers of the hookworm, it is noteworthy that they are not representative of the poor or ignorant, but rather of the comfortably situated middle class, with some examples of even superior intelligence. This is indicated by a review of their occupations and social status, which also seems to offset the idea of several writers that uncinariasis should be regarded chiefly as an occupational disease. Thus, there were 22 students, nine of grade schools, nine of high schools, one of a fashionable boarding school and three of colleges; there were one high school teacher, and two grade school teachers, two graduate trained nurses of exceptional qualifications, two "ladies" in the old sense of a woman of position (college graduates), one owner of a large textile mill, one retail clothier, one undertaker, one newspaper man, one interior decorator, one traveling salesman, one captain of a U. S. hydraulic dredge, one postmaster, one stationary engineer, two telegraphers, one telephone operator, one brakeman, one railroad car repairman, one flagman, one auto mechanic, one sailor, three clerks, two bookkeepers, one stenographer, one beauty expert, two barbers, one filling station attendant, one knitting mill operative, one of no occupation, six housewives, and only two farmers and two laborers. The distribution by states is as follows: North Carolina, 27; Florida, 14; Tennessee, 11; Georgia, 7; Alabama, 3; Kentucky, 2; West Virginia, 2; Indiana, 1, and Ohio, 1, the last three being above the zone to which the disease is supposed to be confined. As the usual statistical reports give the ratio of urban to rural cases, it was noted that in this series there were 27 from cities of forty thousand population or more, while many of the 41 remaining were from communities of ten thousand or over. Of the larger places there was one from Atlanta, there were two from Birmingham, two from Jacksonville, three from Knoxville, two from Tampa and one from Huntington. The females outnumbered the males 38 to 30. Ages ranged from eight to fifty-four, but there were only four over forty, and seven in their thirties, which corresponds to records from other sources, which show that infestation is most common in childhood and becomes much less frequent after the barefoot period.

Anemia was general, but more marked in the group in which tubercle bacilli were found in the sputum. It consisted, usually, of a low hemoglobin percentage rather than a low erythrocyte count. The average eosinophil estimation was 7.5 per cent. There was one of 44 per cent in a mill owner, fifty-four years old, whose stools swarmed with larvae and ova. There was one of 28 per cent and another of 24 per cent. There were nine cases with a percentage of 3 or less. After treatment the eosinophils decreased 50 per cent within two weeks or a month, and were found to be normal three months later. The anemia improved more slowly.

The technic of stool examination is extremely simple. In our laboratory it is that of Stitt: the emulsification in two drops of water on a glass slide of as much feces as may be picked up on the flat end of a toothpick, using a two-thirds inch objective and a one inch ocular, with-

out cover glass. If the characteristic oval, thin shelled eggs, 38 by 60 microns, with clear zones, separating the segmented, granular, central portion from the shell, are not seen, the centrifuge is used with the method of Bass. This consists of adding water to the specimen and shaking until it is diluted about ten times and forms a good suspension. It is then strained through gauze into a centrifuge tube, spun not more than eight seconds (to avoid disintegration) and the sediment examined on a slide after pouring off the supernatant fluid. We have been fortunate in having, for the past eight years, the services of a technician, Mr. Max Riesenberg, who has had a remarkable experience in intestinal parasitology, with the Philippines as a background.

A few months ago, in the routine performance of the technic described he found the ova of *Trichuris trichiura* (trichocephalus dispar), or whipworm, in a specimen submitted by a lady of thirty-six, from Florida, who had had active pulmonary tuberculosis seven years before. She was referred to the clinic on account of weakness, fatigue, nervousness, flatulence, and a vague aching throughout the chest, relieved at times by belching. Physical examination revealed no adventitious sounds in the chest, which was resonant throughout, although there was a little modified breathing in one small area. The x-ray showed such evidences of an old, healed lesion as heavy hilar shadows and very dense, evidently calcareous nodes; the sputum was negative; so was the Wassermann; the urine was normal; the hemoglobin was 68 per cent, the red cells 3,948,000; the white 13,400; eosinophils 4 per cent. After elimination of the parasite the patient regained her strength and recovered from her nervousness, digestive disturbances and the few pulmonary symptoms which had made her apprehensive. Upon discharge her hemoglobin was 77 per cent, her erythrocytes 4,528,000, and leukocytes 10,000. The treatment in this case consisted in the administration of iron sulphate in the dose of 0.320 gm., p. c., with a saline before breakfast every other morning.

The results were so prompt and thorough, and free from the usual unpleasant and, at times, dangerous features of most vermifuges that it was decided to adopt the method for all subsequent cases of hookworm disease. Since then we have had four cases of the latter treated with equal success, to the envy and regret of other patients still on the cure who have vivid memories of the starvation-saline-thymol procedure, which, in some instances, proved almost too severe for advanced cases of tuberculosis.

The use of ferric sulphate originated in the practice of the senior author soon after graduation, in the early nineties. In southern Michigan he saw the mother of four young children administer a dose of medicine for worms. Upon inquiry as to the nature of the remedy she said, "it's copperas, and it works." He adopted it empirically, as there was nothing on the subject in the literature of therapeutics, and found that the woman was correct. It has proved a reliable agency for ridding the intestinal tract of *Ascaris lumbricoides* and other worms throughout an experience of nearly forty years. As yet there appear to be no references to the sulphate of iron as a vermifuge.

It may be profitable, from a diagnostic standpoint, to analyze a little more closely the records of some of the cases in which tuberculosis was suspected but not found, but in all of which hookworm was present.

Case 8613.—The symptoms for which the patient was referred were dyspnea, nervousness and hysteria; pain in the chest upon deep breathing; slight elevation of temperature and loss of twenty pounds. Blood pressure was 90 systolic; 60 diastolic. After treatment all of the above symptoms disappeared, weight was regained and blood pressure improved.

Case 5459.—Symptoms for which the patient was referred were pain in chest, slight expectoration, and loss of nine pounds. Larvae, as well as ova, were found in stools. There was a perfect recovery.

Case 3037.—The symptoms were cough and expectoration; loss of three pounds. There was a perfect recovery.

Case 7627.—The symptoms were fatigue, night sweats, a temperature of 99°; some expectoration but no cough; slight chest pain at times; sour stomach and flatulence. She was admitted to a state sanatorium in 1923, where she remained ten months, then she came to Asheville, where she was in a local sanatorium for four months, after which she changed to another local sanatorium, where she was seen in January, 1927, after she had been in bed for four years. While one of her complaints was a loss of 20 pounds in two years, at the beginning

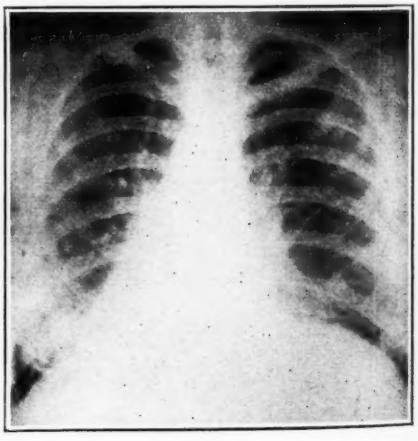

Fig. 1-A
Case 7627, non-tuberculous; when first examined, showed lines to periphery.

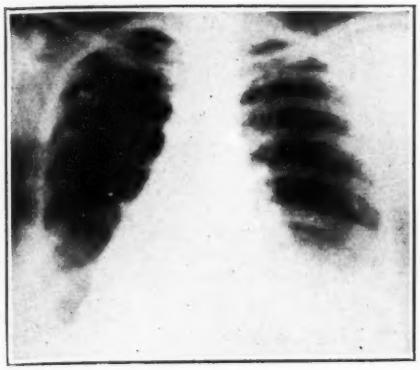

Fig. 1-B
Case 7627, three months after treatment.

of her illness, when she was examined she was decidedly overweight and had a blood pressure of 150 systolic and 84 diastolic. She was thirty-five years old; had been married five years, and had no children. Physical examination by Dr. Dunn, which was done before the x-ray and laboratory reports were submitted to him, resulted in the remark: "Never tuberculous. Suspect hookworm." All of the laboratory findings bore this out, and after treatment by thymol the patient was discharged perfectly well and has remained so from reports received since her return home.

It is worth while to note that in this instance a fairly intelligent woman was confined to bed for four years and the diagnosis of tuberculosis was made by her family physician, the physician of a state sanatorium, and one or two other physicians who specialize in pulmonary diseases. She lost four years of the best time of her life in a purely vegetative existence, at an expense which was a considerable economic strain for her husband.

Case 7216.—The symptoms were nervousness, dizziness for three years, indigestion, flatulence, and pain at the angle of the scapula when flatulence was present. She was tired in the summer, but better in the winter. She had been examined nine months previously in Indiana, pronounced tuberculous and advised to come to Asheville.

The patient said that she had cleared her throat and expectorated since her earliest recollection. Her indigestion was sufficient to cause dyspnea, with rapid pulse. She was found to have chronic inflammation of the naso-pharynx, also a cervical rib. Dr. Dunn's remarks on the x-ray were: "Peculiar findings. Not suggestive of tuberculosis. May be related to sinus or hookworm. Treat both." She recovered.

Case 8001.—The patient had been tired between the shoulder blades for two or three years; she had had a dull ache in the chest anteriorly, with a cough, off and on, for eighteen months, with expectoration which was streaked with blood once or twice when she had a cold. Her temperature had been 100° two or three times lately; there had been swollen cervical glands and dyspnea on exertion. She had lost nine pounds. Dr. Dunn's remarks on the x-ray were: "Few fine lines to pleura, posteriorly. Suggestive of hookworm." The condition cleared up on appropriate treatment.

Case 3789.—The patient had a severe cold one month previously, with cough and expectoration since. The referring physician said she had rough breathing on both sides and he suspected tuberculous involvement. The blood pressure was 100 over 60. Injection of 0.3 tuberculin was negative. The intradermal test was plus, minus. Hookworm was found. Treatment resulted in recovery.

Case 3872.—There was pain over the precordium. The referring physician thought it an intestinal disorder. There was cough and expectoration at times with cold. A note on the chart said: "No evidence of tuberculosis or heart disease." She recovered with treatment.

Case 8289.—The complaint was of pink sputum at intervals for twenty years, hawked up, no cough; frequent coryza; dyspnea on moderate exertion; indigestion suggesting appendicitis; constipation; easily fatigued all life. Blood pressure was 164 systolic; 112 diastolic. Remarks were: "No active tuberculosis; uncinariasis, sinusitis and ethmoiditis." The condition cleared up under appropriate treatment.

Case 7480.—The complaint was of cough and hoarseness. The referring physician heard a "rattling noise in the right lung." The blood pressure was 100 systolic; 70 diastolic. The patient had lost twenty pounds. Notes on the x-ray said: "Slight lines significant. No tuberculosis." Recovery followed thymol treatment.

Case 8100.—The patient had coughed since having pneumonia three years before. Appendectomy had been performed one year before. There was loss of strength and loss of appetite, nausea and vomiting. The temperature was 99°. Following a tuberculin injection the

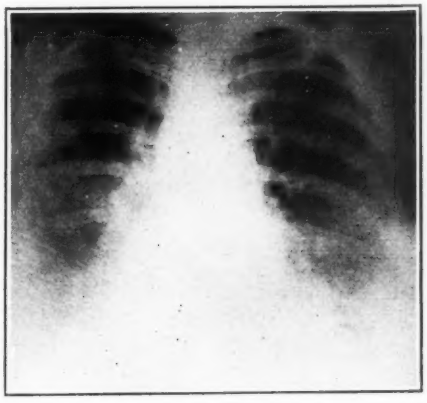

Fig. 2
Case 7216, non-tuberculous with cervical rib; hookworm disease and sinusitis.

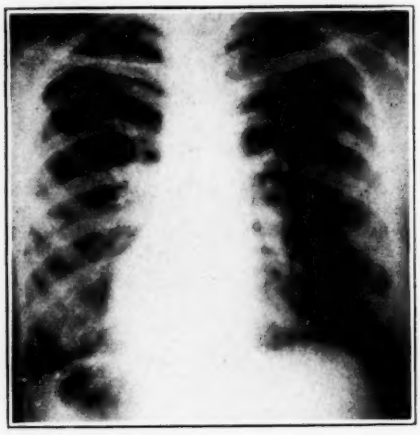

Fig. 3-A
Case 8100, non-tuberculous; when first examined.

patient became ill, nervous and weak, with a dull pain in the left chest. There were also night sweats, epigastric pain and flatulence. The referring physician said the patient had trouble in both upper lobes. The x-ray showed no evident tuberculosis. There was bronchiectasis. After treatment for uncinariasis, the patient was discharged well.

Case 2996.—The patient had lost ten pounds, was weak, tired, lacked energy, had dyspnea and depression, most marked two hours after breakfast. The heart was rapid in the morning. There was no evidence of tuberculosis. Hookworm was diagnosed and cured.

Case 5544.—The complaint was of bilious flatulence, heavy head, coated tongue relieved by salts, poor appetite, and constipation. The patient had been on a diet for twelve months, had taken C. C. pills, liver pills, salts, oil, cascara, and had had an operation for appendicitis. Fatigue, dyspnea and night sweats were reported. The sputum and Wassermann were negative. Notes on the x-ray said: "Both apices hazy. Significant." The patient was sent home to be treated for hookworm by the family physician.

Case 6857.—The complaint was of fatigue for the previous two years, with dizziness, frequent colds, pain in the epigastrium and cardiac region, at times "scattered over the chest," headaches in increasing severity, one night sweat during the previous week, and dyspnea on exertion. The temperature was elevated. There was constipation and flatulence, and loss of 21 pounds in weight. The note said: "No evidence of active tuberculosis. Migration of larva may have made signs. Treat hookworm."

Case 7663.—The patient had lost five pounds and had had slight expectoration for a month. X-ray and the diagnosis by family physician indicated a "serious condition." The patient had a poor appetite, and was very nervous. Notes on the x-ray said: "Right upper. How much due to hookworm?" The patient was discharged normal.

Case 5391.—The temperature was 100° in the afternoon at times. The patient had double pneumonia one year previously, and pain in the chest, with a succeeding loss of 54 pounds, and had applied for admission to the State Sanatorium. The note said: "Bad tonsils and hookworm. No active tuberculosis. Treat hookworm; then application to sanitarium will be unnecessary." This turned out to be the case.

Case 4061.—The complaint was substernal and interscapular pain, with a temperature of 99° in the afternoon. The note said: "No evidence of tuberculosis."

As further complications, two cases of syphilis were found in the series; one of malaria, and one of bronchiectasis. These received the necessary additional treatment.

There are several references in Dr. Dunn's notes to "fine, interlacing lines" in the x-ray, which, in his opinion, were significant of the presence of hookworm. Such appearances may be the result of a reaction to irritation by the larvae in their passage from the pulmonary capillaries to the alveoli, and bronchi, prior to being swallowed (as described by Loos, Dock and Bass, Stitt, Chandler and others). It is a rather fine point, representing one of those almost intuitive impressions which come after many years of experience. It is of value, as part of the general picture, and as a differential feature in connection with the earliest x-ray evidence of the extension of the tuberculous process into the lung tissue. Such refinement, however, is not essential for the majority of us in the absence

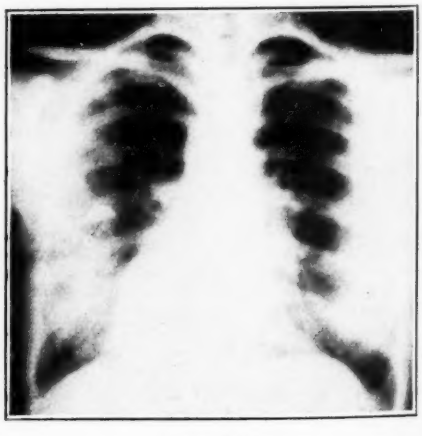

Fig. 3-B
Case 8100, three months after treatment.

of other signs of infection, the presence of a low color index, eosinophilia and because of the ease with which the ova of the parasite may be detected in the stools.

In one of his farewell addresses before leaving this country for England, Osler advised his audience of physicians and students to provide themselves with three important adjuncts to the successful practice of medicine, a library, a laboratory and a nursery. In many instances the maintenance of the nursery may have made serious inroads upon the upkeep of the library and the laboratory, but an ordinary, old-fashioned microscope soon pays for itself in the routine examinations of urine and feces, and should be an essential piece of equipment in the office of every practitioner in the South. When the examination of stools becomes a general procedure, much diagnostic confusion will be avoided, patients will be saved considerable time, expense and worry; and with prompt treatment of all infestations, a real advance will be made toward the eradication of uncinariasis, a menace to the progress of a large and potentially productive section of this country.

SUMMARY AND CONCLUSIONS

(1) With the exception of three "resort states," in which high rates are due to imported cases, there is more tuberculosis in the South than in any other section of the United States.

(2) Hookworm disease is also widely prevalent, in spite of two decades of organized effort toward eradication.

(3) Sixty-eight cases are presented, in 43 of which both diseases were present, while there were 25 cases of uncinariasis which had been referred with a diagnosis of tuberculosis.

(4) The technic of stool examination is extremely simple and should be a routine procedure of every general practitioner, at least in the South.

(5) Ferric sulphate is efficient as a vermifuge for hookworms, whipworms and roundworms, and is safe and free from discomfort in the treatment of weak and emaciated individuals.

*We are indebted to Mr. Robert Millaire, our x-ray technician, for the reproductions of his x-rays of the cases presented. The photographs were taken with a pinhole diaphragm and an exposure of eleven minutes.

REGIONAL ANESTHESIA IN THE TREATMENT OF FRACTURES AND DISLOCATIONS*

By J. D. HIGHSMITH, M.D., F.A.C.S.,†
Fayetteville, N. C.

In 1922, we first began the use of regional anesthesia, employing sacral nerve block anesthesia in surgery of the prostate gland and bladder. The field of usefulness of this form of anesthesia was soon extended to include hemorrhoidectomies, dilatation and curettage, perineor-

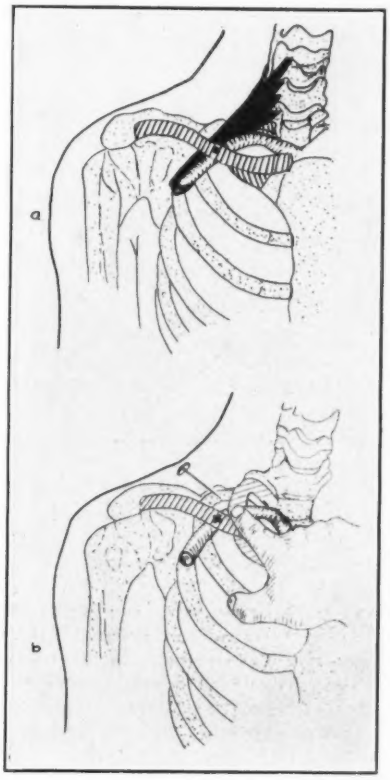

Fig. 1
Brachial plexus block by the supraclavicular route. Complete picture of the anatomic features which the anesthetist visualizes while facing directly the supraclavicular region at about the level of the mid point of the clavicle. (From Labat's Regional Anesthesia.)

*Read in Section on Railway Surgery (Southern States Association of Railway Surgeons), Southern Medical Association Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

†Surgeon, Highsmith Hospital, Inc.

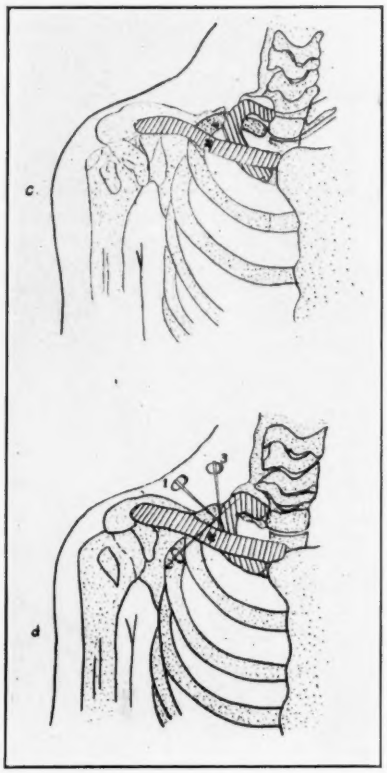

Fig. 2
Brachial plexus block by the supraclavicular route. The success of the operator depends upon his ability to locate the first rib, thus avoiding the puncture of the pleural dome. (From Labat's Regional Anesthesia.)

rhaphies, trachelorrhaphies, and other operations. Soon thereafter we realized that better relaxation and, consequently, better visualization of the operative field was afforded by this form of anesthesia than it was possible for us to get with general ether narcosis, and we commenced the use of paravertebral nerve block anesthesia in most of our kidney operations, in certain abdominal operations, and the use of cervical plexus block in thyroidectomies. In operations performed upon organs and structures which are fixed and accessible such as a kidney, prostate gland or goiter, nerve block anesthesia is practical and easily performed.

Since 1924, we have employed regional anesthesia by the nerve block method for the reduction of fractures and dislocations where general narcosis was contraindicated. Gradually it has become our procedure of preference in this line of work.

The same contraindications to inhalation anesthesia in general surgery apply as well in the reduction of fractures and dislocations. Under such a heading would come the aged and the patient with a decompensating heart or with pulmonary or renal disease. The majority of fractures of the upper extremities are ambulant cases. They make up part of an office or outpatient rather than a hospital practice and in this type of fracture regional anesthesia finds a great field of usefulness even though a general anesthetic is not contraindicated.

One of the chief advantages afforded by this form of anesthesia is that the patient can be anesthetized in the operating room and go a distance to the roentgen ray department for reduction of the fracture under the fluoroscope. This is much to be preferred to the transportation of an unconscious patient or to the administration of a general anesthetic in the roentgen ray department; for in working with a patient in the dark fluoroscopic room under general anesthesia, a certain amount of worry is experienced by the surgeon and anesthetist. Conse-

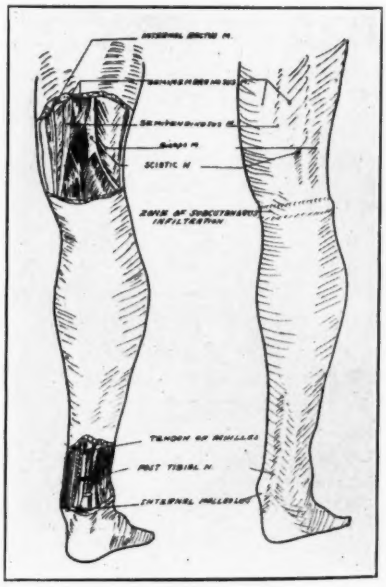

Fig. 3
Illustrating popliteal block. (From Labat's Regional Anesthesia.)

quently, manipulations are hurried and reductions frequently imperfectly performed, the surgeon being hampered by frequent interruptions due to anesthetic recoveries which may ruin a perfect reduction.

In 1885, Conway first advocated the use of cocaine in the reduction of fractures and dislocations. Since then many European surgeons have resorted to the use of local infiltration anesthesia for this purpose. Braun, in 1913, describes the use of local conductive anesthesia and gives a brief summary of fifty cases which he has treated in the past year and states that he has received the impression that in dislocations reduction is accomplished much more easily under local anesthesia than when general anesthesia is used. Very little reference is made to this subject in American medical writings. Cohen, in the *Journal of the American Medical Association,* June 19, 1926, states that he has used local infiltration anesthesia since 1924 with good results and recommends it particularly in ambulant fractures. Forrester, in the *American Journal of Surgery,* September, 1928, has an article on the reduction of fractures and dislocations under local anesthesia. He gives an account of the work being done by Professor Bohler, of Vienna, in the reduction of fractures and dislocations by this method. Sigmund Mage, of New York (*Annals of Surgery,* May, 1927), has the only article that I have been able to find on the use of regional anesthesia by the nerve block method. He reports fifty cases of fractures involving the extremities in which general anesthesia was contraindicated and which were successfully treated in this way.

By local anesthesia is meant that form of anesthetization accomplished by the actual infiltration of the anesthetic fluid into any local part. Regional anesthesia differs from local anesthesia in that the anesthetic fluid is never injected into the line of incision or within the structures of the surgical wound. It may be produced by the use of two different types of procedure: (1) field block, which consists in creating an encircling wall of anesthesia by infiltrating the tissues in definite planes around the operative field; (2) nerve block, which consists in making novocaine injections in close proximity to the nerve or nerves whose conductivity it is desired to cut off.

All cases in this series were reduced by the nerve block method of regional anesthesia without any complications or untoward results. The possible dangers of this procedure, I believe, are always avoidable with a careful technic and attention to details. The method seems to us to be the desirable and logical one to employ in the presence of the pathological conditions associated with fractures and dislocations where what you want above all other things is muscular relaxation. The infiltration of an anesthetic fluid into or about traumatized tissues associated with bone and joint injuries is unsurgical and certainly should be contraindicated in a compound fracture or a simple fracture with a great deal of trauma and contusion of the muscles.

Nerve block produces anesthesia of an involved area and avoids damage to the already injured tissues.

The type of lesions with which we are concerned are essentially those of the upper and lower extremities, as these are the cases best adapted to this form of anesthesia. Thus a physiological section of the brachial plexus at the proper site with the proper technic will anesthetize the whole upper extremity. Also a block of the individual nerves median, ulna or radial, at the elbow will anesthetize the forearm and hand; a block of the sciatic and anterior crural or of the popliteal nerve in the popliteal space will anesthetize the leg and foot. The deposition of the drug about any nerve will temporarily anesthetize the area it controls.

In any fracture or dislocation the logical plan is to block the nerves proximal to the fracture or dislocation and, depending on the site, various levels may be available: for example, a dislocation of the wrist joint may be reduced under block of the median, ulna and radial nerve at the wrist; a block of the median, ulna and radial nerve at the elbow or a brachial plexus nerve block. A fracture of the os calcis may be reduced under either an anterior and posterior tibial block at the ankle, a physiological section of the popliteal nerve in the popliteal space or a sciatic and anterior crural block. In our cases, after trying the various procedures, I have come to the conclusion that the brachial plexus block and the popliteal block are the methods best suited and most feasible in this line of work, as the anesthesia obtained is more profound and relaxation more nearly perfect than in any of the other methods.

At first we selected only cases in which an immediate manipulative reduction under an anesthetic was necessary and general narcosis contraindicated. But gradually we have extended the field of usefulness, due to the many advan-

TABLE I

ANALYSIS OF 35 CASES

Upper Extremity	No. of Cases
Dislocation of shoulder	4
Dislocation of elbow	5
Fracture of humerus	7
Fracture shaft of radius and ulna	3
Fracture lower extremity of radius and ulna (Colles)	6
Fracture metacarpal bones	2
Lower Extremity	
Fracture middle third femur	1
Fracture lower third femur	1
Fracture shaft of tibia and fibula	2
Fracture lower extremity of tibia and fibula	4

tages over general narcosis, to include in several instances children under eight years of age. Most patients suffering from fractures and dislocations dread the idea of taking a general anesthetic more than they do the reduction, and appreciate the regional method of anesthesia, especially if you explain its advantages to them.

The prime requisites of a satisfactory anesthetic are: (1) that it be safe; (2) that it render the operative procedure painless; and (3) that there be adequate muscle relaxation. Regional anesthesia is safe in the hands of one who has had training in antiseptic and aseptic surgery and who will master its technic and pay attention to the details and not inject the solution into a blood vessel. In *Table II* you will see an analysis of the 35 cases mentioned in *Table I.*

In every case except three analgesia was complete and relaxation excellent. The following are some examples of the types of cases chosen by us for this form of anesthesia when we commenced its use:

Case 16273.—A white man, age 85 years, with very marked arteriosclerosis and chronic bronchitis, an inmate of the County Home, had an impacted fracture of the head of the humerus. One attempt at reduction had been made unsuccessfully. The patient was in a great deal of pain and distress, even though morphine had been given thirty minutes prior to his admission to the hospital. A brachial plexus nerve block was given by the supraclavicular method, 2 per cent novocaine suprarenin solution employed, and the fracture reduced. Anesthesia was quite satisfactory and muscular relaxation as complete as one obtains with the most profound ether narcosis.

Case 17480.—A white man, age 60; rather obese and a chronic alcoholic, came into the hospital complaining of pain and swelling in the right shoulder, having injured his shoulder while drunk two days prior to admission. The diagnosis was subcoracoid dislocation of the shoulder. The patient was given morphine sulphate gr. ¼ with atropine sulphate gr. 1/150; a brachial plexus block was given by the supraclavicular route, employing 2 per cent novocaine with suprarenin. Anesthesia was good, relaxation excellent and reduction of the dislocation was made without difficulty.

TABLE II

No.	Diagnosis	Method	Analgesia	Relaxation	Result
16273	Impacted fracture, neck of humerus	Brachial	Complete	Excellent	Successful
20496	Impacted fracture neck of humerus	Brachial	Complete	Excellent	Successful
16665	Fracture surgical neck of humerus	Brachial	Complete	Excellent	Successful
17727	Fracture surgical neck of humerus	Brachial	Complete	Excellent	Successful
20493	Fracture shaft of humerus, mid. third	Brachial	Complete	Excellent	Successful
19258	Frac. lower extrem. of humerus, both condyles	Brachial	Complete	Excellent	Successful
17407	Frac. upper third of humerus, open operation	Brachial	Complete	Excellent	Successful
17480	Dislocation of shoulder (subcoracoid)	Brachial	Complete	Excellent	Successful
18668	Dislocation of shoulder (subcoracoid)	Brachial	Complete	Excellent	Successful
18097	Post dislocation shoulder, frac. neck humerus	Brachial	Complete	Excellent	Successful
19065	Dislocation of shoulder (subcoracoid)	Brachial	Complete	Excellent	Successful
18683	Dislocation of elbow (backward)	Brachial	Complete	Excellent	Successful
19543	Dislocation of elbow (backward)	Brachial	Complete	Excellent	Successful
20145	Dislocation of elbow (backward)	Brachial	Complete	Excellent	Successful
21002	Dislocation of elbow (backward)	Brachial	Complete	Excellent	Successful
20121	Dislocation of elbow (backward)	Brachial	Complete	Excellent	Successful
20097	Frac. shaft of radius and ulna, lower third	Brachial	Complete	Excellent	Successful
21348	Frac. shaft of radius and ulna, lower third	Brachial	Complete	Excellent	Successful
17727	Frac. lower extremity, radius (Colles)	Brachial	Complete	Excellent	Successful
18456	Frac. shaft of radius and ulna, middle third	Brachial	Complete	Excellent	Successful
20470	Frac. lower extremity, radius and ulna (Colles)	Brachial	Complete	Excellent	Successful
21122	Frac. lower extremity, radius and ulna (Colles)	Brachial	Complete	Excellent	Successful
16870	Frac. lower extremity radius (Colles)	Brachial	Complete	Excellent	Successful
20121	Frac. lower extremity, radius	Brachial	Complete	Excellent	Successful
20097	Frac. lower extremity radius (Colles)	Brachial	Complete	Excellent	Successful
16530	Frac. first metacarpal bone, torn tendons, lacerations	Radial and median (wrist)	Fair Complete	Fair	Fair Successful
19543	Frac. first metacarpal bone, severed tendon	Brachial		Excellent	Successful
20097	Frac. lower third of femur	Anterior, crural and sciatic	Complete Complete	Fair	Successful
20975	Frac. middle third of femur	Anterior, crural and sciatic	Complete	Fair	Successful
16397	Frac. shaft of tibia and fibula, upper third	Popliteal	Complete	Excellent	Successful
17264	Frac. tibia and fibula, middle third	Popliteal	Complete	Excellent	Successful
16703	Frac. lower extremity of tibia and fibula	Popliteal	Complete	Excellent	Successful
20186	Frac. lower extremity of tibia and fibula	Popliteal	Complete	Excellent	Successful
19986	Frac. lower extremity of tibia and fibula	Popliteal	Complete	Excellent	Successful
20369	Frac. lower extremity of fibula	Popliteal	Complete	Excellent	Successful

Case 17727.—A white woman, age 55, obese, a diabetic, had a compound fracture of the surgical neck of the humerus and a Colles fracture of the same arm. The patient was delirious. Several unsuccessful attempts at reduction had been made. She was given a brachial plexus block by the supraclavicular route employing 2 per cent novocaine with suprarenin; anesthesia was good and muscular relaxation excellent; the results were satisfactory.

Case 18668.—A white man, age 83, had a dislocation of the shoulder of six days' duration. He was suffering a great deal with considerable swelling of the arm and shoulder. No attempt at reduction had been made. He was given a brachial plexus block by the supraclavicular route, 2 per cent novocaine with suprarenin being employed. Anesthesia and relaxation were both satisfactory; reduction was successful.

In each one of the cases cited any form of general anesthesia was contraindicated, as was also the local infiltration method, because of the edema, swelling, and pain at the site of the injuries. Had it not been for the use of regional anesthesia we should have had to abandon or modify the treatment, and as it is we obtained results satisfactory both to ourselves and the patients.

Fractures of the femur are generally treated by prolonged traction and suspension and usually do not require anesthesia. However, there are two cases in this series where anesthesia was indicated and both patients were given anterior crural and sciatic blocks. Spinal anesthesia might have been employed in either case, but we make it a rule never to use spinal anesthesia in the presence of shock. However, with the present day method of employing spinal, that is, preceding the subarachnoid injection with ephedrine, I believe it would be perfectly safe and more easily performed than the anterior crural and sciatic block.

Case 20097.—A farmer, age 22, had a compound fracture of the left femur, lower third, and a compound fracture of the right radius and ulna, lower third. He was brought to us from a distance of 60 miles in a dilapidated Ford. On admission he was in severe shock. An anterior crural and sciatic block was done, employing a 1 per cent novocaine suprarenin solution; he was also given a brachial plexus block, employing 2 per cent novocaine suprarenin solution; relaxation in both instances was adequate and reductions were made without discomfort to the patient.

Case 20975.—A farmer, age 18, had a fracture of the middle third of the left femur. He was brought to the hospital, a distance of 50 miles, on a truck, suffering a great deal and in a moderate degree of shock. Anterior crural and sciatic block was given. The fracture was reduced and tongs were applied; muscular relaxation was adequate and the patient had no pain during the reduction.

Fractures and dislocations about the elbow, both in children and in adults, make up a fairly large per cent of our fracture cases and the results are not infrequently bad. They are a class in which not infrequently there is a tremendous amount of swelling injury to the soft parts and adjacent nerves, particularly the ulna, which might easily be irreparably damaged in a hurried attempt at reduction in the fluoroscopic room when general narcosis is employed.

Case 20121.—A school boy, age 13, had a posterior dislocation of the left elbow and fracture of the head of the radius. A brachial plexus nerve block was given, the patient was carried to the fluoroscopic room and reductions were accomplished without pain. Muscular relaxation was excellent.

Case 20145.—A school boy, age 14, had a posterior dislocation of the elbow, a fracture of the olecranon process and a fracture of the upper third of the left radius. He was given a brachial plexus block, carried to the fluoroscopic room and reductions were made. Considerable time was required due to the severity of the injury, and I am confident that had we been using general narcosis our results would not have been so good.

A Colles' fracture or fracture of both bones of the forearm may be reduced with a block of the median, ulna and radial nerves at the elbow. I have tried this on several patients, but find that the resistance offered by the arm musculature made the reduction much more difficult than under a brachial plexus block where there is generalized relaxation of the entire arm.

Compound fractures of the tibia and fibula and fractures about the ankle, we find, are best reduced by popliteal nerve block. No unfavorable resistance is offered by the thigh muscles, though the relaxation here is not so profound as it is in the upper extremities under the influence of brachial plexus block.

Case 19986.—A negro farmer, age 50, had a compound comminuted fracture of the lower third of the left tibia and fibula of four hours' duration. He had a well developed musculature. A popliteal nerve block was done with 1 per cent novocaine suprarenin solution; the fracture was reduced and maintained by means of traction.

Case 20186.—A negro man, a farmer, had a fracture of the lower end of the tibia and fibula (Potts') of six hours' duration. He was of the powerful muscular type. He was given a popliteal nerve block with satisfactory anesthesia and adequate muscular relaxation.

The preoperative preparation is not elaborate, as these are all a class of emergency cases. The patient's mind is prepared by telling him beforehand the kind of anesthetic we plan to employ and explaining briefly its advantages. Most of them are very cooperative and appreciative. A preliminary hypodermic of morphine sulphate usually with scopolamine is given to blunt consciousness; the size of the dose depends upon

the physical and mental state of the patient and how much morphine, if any, he has had before reaching the hospital.

It is essential that the needles employed be thin, sharp and smooth and that the syringes be serviceable. I find the Labat outfit to be satisfactory. We employ novocaine (Metz) together with suprarenin, believing that suprarenin intensifies the anesthesia and prolongs it.

The general principles involved in the technic of any nerve block are essentially the same. Briefly, first, one must know the landmarks or anatomical features of the body that serve to locate the nerves, and one must have a clear mental picture of the relation of the structures as they lie under the skin, and a sense of the direction in which the needle is to be advanced. Superficial landmarks are obtainable either by sight or by palpation of the soft structures overlying the framework and consist of blood vessels, muscles, bones and tendons. Superficial landmarks are used as a means of approaching the deep landmarks and should be taken accurately. Bones are the ordinary deep landmarks.

I will not go into a discussion of the technical aspects involved in any of the injections other than the brachial plexus and popliteal nerve blocks, as these are the methods which I have found give the most satisfactory anesthesia and relaxation.

The brachial plexus is most accessible just above the clavicle owing to its situation in the superficial layers of that region. The midpoint of the clavicle is determined by taking half the distance between the sternoclavicular and acromioclavicular articulations, which point is usually found to be just external to the external jugular vein and is apparent in the great majority or can be made visible by asking the patient to blow out his cheeks. The subclavian artery is defined by palpation and a wheel raised in the skin just lateral to it and one finger's breadth above the clavicle. The subclavicular artery is retracted inwards and downwards and a needle usually 5 cm. long is introduced through the dermal wheel in a direction backward, downward and inward toward the first rib. In lean patients the first rib can be palpated at this point by pressing the fingers into the supraclavicular fossa. As soon as the characteristic tingling is felt by the patient the needle is held stationary, the syringe attached to it and the novocaine slowly injected. If paresthesias are not obtained, contact is taken with the first rib and the injection made with the needle held in contact with the rib.

In making the popliteal block, the patient is usually lying on his stomach with both legs in extension; however, the block may be made successfully with the patient lying on his side. The popliteal space is defined and its upper limits traced on the skin. The angle formed by the two lines traced is bisected and a wheel raised in the bisecting line about 7 cm. above the knee joint. A needle 5 cm. in length or longer, depending on the weight of the patient, is introduced through the wheel in a direction perpendicular to the skin until the point has passed the deep fascia. It is then gently advanced from 1 to 2 cm. farther, where the injection is made as soon as radiating sensations are induced. If paresthesias are not induced in this way, the point of the needle should be directed upward for a short distance, then outward and inward. I have found that when characteristic radiating sensations are not induced all that is necessary is to fill the popliteal space with novocaine solution and usually in this way good anesthesia is obtained.

In general the anesthesia lasts from one and one-half to two hours, the strength of the solution, quantity employed and accuracy in making the injection having a determining effect on this. Positions may be checked and rechecked, retention apparatus applied and adapted before muscle tonicity begins to return. The application of immobilizing bandages and extension is also facilitated, and is not interrupted by the movements of the patient which may occur under general anesthesia.

SUMMARY AND CONCLUSIONS

(1) In the reduction of fractures and dislocations in the aged and the patient with a decompensated heart, or with pulmonary or renal disease, general narcosis is contraindicated and nerve block the indicated anesthetic.

(2) In dislocations nerve block is invaluable due to the profound muscular relaxation obtained.

(3) The advantages of nerve block anesthesia in the treatment of fractures and dislocations are obvious if we consider that we can make such fractures and dislocations entirely painless. We can then move the patient to the fluoroscopic room and, without hurry, work out the best position of the bones. Besides all this, we do not have to contend with the excitation of the patient while he is going under a general anes-

thetic and are not hampered in our work by frequent anesthetic recoveries, imperfect muscular relaxation and worry over the condition of the patient under general anesthesia in a dark fluoroscopic room. The application of immobilizing bandages is also facilitated and not interrupted by movements of the patient which may occur under general anesthesia.

(4) The many advantages afforded by nerve block have caused me to give it preference over general narcosis and local infiltration anesthesia in the treatment of fractures and dislocations.

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Discussion follows paper of Dr. Slocum, page 815.

FRACTURES OF THE SHAFT OF THE FEMUR*

By DUNCAN EVE, JR., M.D.,
Nashville, Tenn.

The treatment of fractures of the shaft of the femur constitutes a very important branch of surgery and the results are far from satisfactory in many cases. We all face the same question in every case: will there be shortening or deformity, and what method of procedure shall we follow in each case?

Since no two fractures are alike, no set rule can be applied in all cases. Our policy in treating fractures of the shaft of the femur is to avoid open operation, unless other recognized methods fail to secure the satisfactory contact. There are cases when it is better judgment not to resort to open operation, when we are certain of good function. It is bad judgment to attempt to meet the demands of an x-ray examination. In many of our cases we are unable to get better than one-fourth contact, but the callus will bridge over and the outcome will be a strong and useful limb. End-to-end approximation is not absolutely necessary for a good functional result.

There are three methods of treating fractures of the shaft of the femur: first, gradual reduction by suspension and traction with the Balkan frame; second, immediate reduction and plaster of Paris cast; and third, the open method with internal fixation.

The advantages of suspension and traction are: the patient is fairly comfortable. Constant inspection and measurement of the limb and joints and movement of the joints are permitted, and the patient can be propped up.

The disadvantages of suspension and traction are: the patient is confined to bed during the entire period of treatment; there is irritation and slipping of the adhesive plaster; the patients require more frequent visits for careful inspection; and there is discomfort from the ring.

The advantages of plaster cast are: perfect control of the patient; also, of the fragments which can be placed in good position under the fluoroscope before the cast dries. It is possible to allow the patient out of bed on crutches. Cast patients do not require much attention.

The disadvantages of plaster cast are: the main objection to the cast is the long period of immobilization of the knee and ankle with resultant joint stiffness. A cast which is improperly applied is useless. This is particularly true in muscular patients and patients of advanced age.

The shaft of the femur is divided into the upper, middle and lower thirds. Sixty-five per cent of our fractures occur in the middle third. Seventy per cent of the cases are transverse fractures.

Our procedure in treating fractures of the shaft of the femur is as follows: as a rule, in the upper third, we use the suspension and traction method with at least 20 to 25 pounds of weight. Our reason for this is that the majority of fractures in the upper third are oblique.

In the middle third, in selected cases of the transverse type, we use a plaster of paris cast. The cast (window) is always removed opposite the knee joint, at about the third or fourth week in adults. There is no doubt that oblique and spiral fractures tend to slip back into the old line of displacement. It is nearly impossible to

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maintain extension in the longitudinal axis of the limb by means of a cast. In using the suspension and traction method in the middle third fractures, we must remember that the weight of the thigh always tends to allow the fragments to fall backward, therefore such conditions should be prevented by padding, to reproduce the natural curve of the femur forward.

Fractures at the extreme lower end of the femur are apt to show a backward displacement of the lower fragment due to the action of the gastrocnemius muscle. After the displacement has occurred it is almost impossible to reduce it by skin traction. We always use skeletal traction when displacement is present. A pin through the condyle with the knee flexed almost to a right angle, using the modified Thomas splint and Pearson knee attachment, readily effects a correction. In the cases with marked shortening and deformity, we avoid open reduction. Our choice is always by skeletal traction. A pin through the lower end of the femur is an aid for traction, and if it is properly used, it will give good results when other methods fail. Since we have used skeletal traction with the pin, we have found reductions to be rarely indicated in recent fractures of the femur.

Shortening of a little less than one inch has been adopted as a standard for the results in fractures of the shaft of the femur by the closed method. It should not be accepted now, however, since skeletal traction is easily obtained.

In the treatment of fractures of the shaft of the femur by suspension, the keynote is correct traction and alignment. These are the fundamental principles. Also, the longitudinal traction shall have free play, not to be hampered by fixation of the limb to the bed or to any apparatus which is not free to move with the limb.

Compound fractures of the shaft of the femur are kept in an extension splint until the infection subsides.

In children we prefer the cast, as it lessens the hospital stay and they can be sent home in a short time, but by almost any method used in children the results are good. In regard to union the shaft of the femur is very much like the clavicle. Non-union in simple fractures is rare. Non-union may occur after an open reduction. Mal-union with deformity and angulation with shortening is common.

Many of the cases will require a walking caliper before leaving the hospital.

In closing, remember that we must make frequent x-ray examinations to guide us as to the proper amount of traction and to correct, if necessary, any bowing or angular deformity.

Discussion follows paper of Dr. Slocum, page 815.

STATISTICS IN FRACTURE WORK*

By Robert B. Slocum, M.D.,
Wilmington, N. C.

Most of us, I think, will agree that traumatic surgery has never been given the same grade of service as other departments of surgery, for example, abdominal. There may be several reasons for this. Traumatic surgery generally means emergency calls and most of us do not like emergency calls. It also often means going to court and we dislike that. At any rate traumatic surgery has never been put on a scientific basis. This is perhaps best proven by the fact that much of the literature is still dogmatic and authoritative.

We have all probably read Oliver Wendell Holmes' essay "Homeopathy and Kindred Delusions." It would be well if we re-read it once a year. Dr. Holmes brings out clearly the two tendencies in human nature that block progress: (1) drawing conclusions from insufficient data, and (2) failure to eliminate the personal equation. You remember that even the British Royal Society accepted Perkins' metallic tractors, and the number of persons both in and out of the profession who believed in the "weapon ointment" and the "sympathetic powders" was large. It is hard to learn and remember that one swallow does not make a summer and also that the individual who reported the swallow may have been mistaken; perhaps he was anxious for summer to come and forgot that it is easy to believe what we want to believe.

In the August, 1929, number of the *Annals of Medical History* you will find the report of a diary kept by Edward Jenner. It would seem that Jenner kept a note book with him and jotted down thoughts as they occurred to him. One of these notes is: "There would be no quacks in the world if physicians had yet learned how to cure diseases." Perhaps we should have more orthopedic surgeons and fewer quacks if we knew how to cure backaches. So often these "back cases" begin by going the rounds of the

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regular orthopedic surgeons and then go to the osteopaths. The joke of it is that the osteopaths are more consistent and uniform in their advice than the regulars. You need only to read the opinions given in such cases by our leading orthopedic surgeons to realize how far apart they are in the interpretation of x-rays, in their conception of the fundamental pathology, and consequently, in their advice as to treatment. All of this means that we are not on a scientific basis. Medicine in general is, of course, far from being on a scientific basis; there will always be art as well as science in medicine. In some departments, however, we have advanced beyond the stage of personal opinion; for example, as to the cause of typhoid fever and other infectious diseases. Such questions were worked out in the laboratory, but such things as strained backs do not seem susceptible to laboratory study unless we can use the ward as a laboratory.

Science is essentially a matter of observation. In some fields of medicine enough data have been collected to enable one to draw fair conclusions. In the field of fracture work, however, about all that we have is the findings of a few men who have had wide experiences. There have been one or two efforts to collect sufficient data, for example, the report of the British Medical Association of 1912. In general, however, all that we have is the opinions of a few men and these opinions are based largely upon their own experiences. One man may have a mechanical turn and get his best results by the use of mechanical devices without open operations. Another man may be more of the artist and do better with operating. One authority will thus write that the only surgeon who has to resort to open operation for fractures is the one who has no mechanical ingenuity; another advises that such devices are relics of past ages and that open operation is the only modern method. It would seem, therefore, that there is a real need for the collection of sufficient data in fracture work and that there should be a central clearing house where the experiences of a large number of surgeons can be collected and compared. Why could not this section of the Southern Medical Association be such a clearing house?

There are many disputed points that would come up for investigation, for example: the question of the best way to handle fractured femurs, by open operation or by traction? If by open operation, should we use "hardware" for internal fixation? It is general practice in medical meetings to joke about this "hardware." Yet if you go about much, you will be impressed by the fact that some, at least, of the best clinics are using metal plates. I might mention Dr. Sherman, of Pittsburgh, and Dr. Estes, of Bethlehem, Pennsylvania. There seems to be still an impression that open operations for fractures are to be avoided on account of the frequency of infections and that the danger is greater when non-absorbable material is used. Of course, it is well known that greater care must be taken in bone operations than in hernia operations. Still I feel sure that actual data would prove that at the present time in good hands infections in operations for fractures are almost as rare as in hernia operations, even when metal plates are used. That would be a splendid subject for investigation. If it can be shown that, except for infections, open operations give the best results, and if it can be proven that such infections do not happen in certain clinics, then we should know it.

There are numerous other questions which will suggest themselves to you. Dr. Garner's paper on the importance of anatomical reductions suggests a subject. Personally I agree with him, but many do not. Does the damage done in approaching the site of fracture in open operations retard union? Does it cause more stiffness? Do frequent x-ray exposures during convalescence tend to injure growing cells and become a factor in delayed union? What effect, if any, has a positive Wassermann upon bony union? In compound fractures, is it best to use metal plates and get anatomical reduction with the expectation of removing the plates later, or is it better to sacrifice perfect apposition and be satisfied with less accurate reduction?

All of these matters are already being discussed at these and other meetings. My idea is to try to get together those papers which give data so that in time we shall be able to draw conclusions.

DISCUSSION (*Abstract*)

Papers of Dr. Eve, Dr. Highsmith and Dr. Slocum.

Dr. W. W. Harper, Selma, Ala.—We should approach fractures with an open mind. Recently while attending the Fracture Clinic of the Clinical Congress of Surgeons in Boston, I was very much impressed with two schools there, one believing in the open operation, the other believing in the closed method, and I came away from that clinic believing that both sides were correct.

In the majority of cases of fracture of the femur we can get excellent results either by skin traction or by skeletal traction.

The orthopedic surgeons use plaster of Paris in all their fracture work. They do not hesitate to break bowlegs, knock-knees and all sorts of fractures and put those cases up in plaster of Paris and they get excellent results. I believe that those who know how to use plaster of Paris certainly get the best results in the majority of cases.

The orthopedic surgeons have told us that we can put up indefinite fractures of joints and there will be no bone ankylosis if there has been no trauma to the joint itself.

In the large majority of fractures, the proper use of plaster of Paris is the ideal form of treatment. There are other cases in which we should use skeletal traction.

In certain cases open operation is absolutely in demand. Those who do the open operation are impressed with the fact that often the cause of the failure of union is that tissue has been interposed between the ends of the fracture. When tissue is interposed between the ends of the fracture, whether you use skeletal traction or plaster of Paris, you will never have union. You must do an open operation to put the bones in apposition. I can see no more danger in operating upon a bone than in operating upon the brain or abdominal cavity.

Harvey Cushing says the only difference between the brain surgeon and the abdominal surgeon is that the abdominal surgeon has a wonderful ally in his momentum, and that most men can do abdominal surgery where it takes a real surgeon to do brain surgery. But if you are clean, and your instruments are clean, you should not get an infection in the majority of cases in doing an open operation.

As to what method to use to hold bones in position, that is up to the surgeon. If you can treat the case without an open operation do so, but where you believe that there is an interposition of soft parts do not lose time, but cut down on the bone and do an open operation.

Dr. Frank P. Strickler, Louisville, Ky.—I am in favor of the use of plaster of Paris as a fixation method of treating the fractures. Having had an orthopedic training, I am naturally partial to plaster.

The main difficulty with other traction treatments is that you have to employ about six nurses to watch the Balkan frame, to keep the traction on and weights adjusted properly. Unfortunately, we have not always that number of nurses to watch our cases. If we put a case up in plaster of Paris, we know exactly where we have our fracture and that it is going to stay there, if we have applied the plaster correctly. Dr. Eve has covered that very well.

I have had very good results from applying traction under the plaster cast. Keep the weights on while the patient is in bed for at least the first three weeks, until you have good fixation. After three weeks, if you are going to get union you usually have it, and can take off the traction.

We should get a careful history of our cases. If there is a history of specific infection, the case should certainly have specific treatment.

I advise, first, the simple form of treatment with traction and plaster. Every case should have at least 50 per cent of bone overlapping. The fracture will stay locked in that position.

I do not believe you can always get a perfect anatomical reduction with the closed or with the open method, whether you use the rectangular intra-medullary graft, massive onlay graft, or inlay graft. We are after not so much perfect anatomical reduction as functional results. Just simply fixing the fracture in position is not all there is to it. The patients should have high calcium feeding, codliver oil and plenty of sunlight. We know these things build bone. In the x-ray of a case without such treatment and a case with it, you will see a marked difference.

In quite a few cases where sodium amytal has been injected intravenously as an anesthetic, our results have been excellent. It is of especial value in fracture work. We give sodium amytal in the patient's room. He goes to sleep immediately and is taken to the x-ray room for examination. He will sleep for four or five hours, allowing ample time for the reduction of the fracture and application of splints. The main thing for which you must watch after this anesthesia is hypostatic pneumonia. The patients should be turned every hour. After sodium amytal all sense of uneasiness and fear is destroyed and you can manipulate the fracture. If you have not complete relaxation, give them a little gas or a quarter of a grain of morphine, and you will get it.

Dr. Southgate Leigh, Norfolk, Va.—I am glad that Dr. Slocum advises anatomical adjustment of fractures. If non-operative measures fail to bring about proper coaptation of the bones, and there is no contraindication from the age or condition of the patient, operation should be done, if it is in a clean operating room and performed by a competent surgeon.

It has been most interesting to me to note the way that the pendulum has swung in connection with operation for fractures.

At one time operation and plates were used extensively. Not long after that plates were almost universally condemned. In the last two or three years operation and plates are again coming into favor.

This is an illustration of the unfortunate lack of conservatism in our profession, and is also an indication of the deplorable carelessness prevalent in regard to the most important matter of all in surgery, and that is surgical cleanliness.

In ordinary cases, with the wonderful aid of nature, a careless surgeon may get fair healing results. It is not so, however, in bone work. Here it is absolutely and vitally necessary to be clean.

The rules of antisepsis are child-like in their simplicity. It is this that probably makes the average surgeon, whose mind is taken up with the weighty matters of surgery, practically ignore them.

It is unsafe to operate upon bones, or, for that matter, upon any clean cases, in a room where septic materials have been smeared over everything. It is unsafe to treat surgical cases in a contaminated hospital. Hospitals and operating rooms may easily become nest beds of infection, just as they were before the days of Lister. The incidence of infection in the hospitals of this country is appalling. It is a crime for a clean wound to be infected, and it is ridiculous to hear the alibis brought forward often to explain infection.

Surgical cleanliness, in its broadest sense, is as much a vital question in surgery today as it was in the eighties when those great pioneers, Gerster, Marcy and Keen, were laboring valiantly to persuade their surgical colleagues of America that cleanliness could revolutionize the art of surgery.

Dr. R. McG. Carruth, New Roads, La.—Whatever success I may have achieved in my emergency surgical work now for the past forty-nine years, I attribute to my efforts to be cleanly and sterile in my work.

For many years I have used liquid glass in preference to plaster of Paris. It is lighter, easier to put on and easier to take off; and if, perchance, it becomes necessary to change, modify or remove it for pain, accident, examination or manipulation, especially when the fracture is near to or includes a joint, you inflict less pain and do less injury to the parts than when you work with plaster. It is easily slit up and, being pliable, is easily removed for manipulation of the joint. It may then be replaced possibly with additional padding and held in perfect position by a few turns of a roller bandage. We thus have the advantage of seeing the result of our work while it is not too late to correct slight maladjustments, bearing in mind that in industrial surgery we must aim not only at anatomical adjustment, but often at cosmetic results.

Dr. I. M. Hay, Melbourne, Fla.—I want to subscribe to Dr. Strickler's remarks. I feel that sodium amytal anesthesia is particularly useful for surgeons in smaller communities, where the more refined forms of general anesthesia are not readily available.

In using the brachial plexus block it is necessary to insert the needle, which should be of small caliber, very close to the subclavian artery. This artery will be unavoidably punctured in some cases, but with a small needle this is of no moment. In case the needle is not directed toward the first rib, it may be missed and some of the solution introduced into the pleural cavity. This causes no symptoms other than a spasm of coughing, provided too much solution is not injected. This form of anesthesia has a very wide field of usefulness and will be more generally adopted in the future.

Dr. Guy A. Caldwell, Shreveport, La.—It is important to secure a complete reduction of most fractures and anesthesia is essential to complete reductions. The question of local anesthesia or brachial block or general anesthesia of one type or another has, therefore, an important bearing on the question of fractures.

Anatomical reduction of a fracture is particularly important in industrial and railroad cases because of the medical and legal aspects and the psychic effect on the patient himself when he sees from the x-rays that he has complete and perfect reduction of his fracture. There can be no question that open operation is the only consistent way to obtain complete reduction and, furthermore, that the success of this procedure is largely dependent upon whether or not post operative infection develops. The theme of operative infections has already been much harped upon, but entirely from the wrong angle. We have been using the nurses' technic for our alibi too long. Infections in operation in 90 per cent of cases I believe to be the fault of the surgeon. The surgeon himself introduces the infection in most cases; perhaps not by coughing, spitting or wiping dirt directly into the wound, but by leaving traumatized tissue and blood clots in the wound to serve as ploughed ground for the growth of vegetative organisms.

We know that no operating room is absolutely sterile. There are pathogenic organisms always in the air and likely to come in contact with the hands of the operator or nurses or fall into the wound. Therefore, no matter how careful the nurses may be there is always the probability that pyogenic organisms for which no one can be responsible gain access to the wound; but if there is little traumatized tissue or blood clot in the walls of the wound (matters which are solely controlled by the surgeon), the ground is unfavorable to their growth and they die without producing apparent infection. The ability of a surgeon to perform a given operation with the minimum tissue damage is the principal factor in the control of operative infections, particularly in the reduction of fractures by open operation and most particularly in cases of fracture of the femur.

The duration of the operation is equally important since the longer one works the more trauma one is bound to do. For this reason Dr. Sherman, of Pittsburg, who probably performs open reductions on more fractures than anyone else, says that such operations should never exceed an hour's duration. The same is held to be true in the orthopedic department at the Mayo Clinic. The tissues cannot tolerate more injury than is usually done in one hour of operating, without losing their ability to overcome the pyogenic organisms which necessarily gain access to the wound.

Unless a surgeon is able to do a relatively non-traumatizing operation and complete it in approximately an hour, he should never undertake to do open reductions on fractures.

Dr. Eve (closing).—We use the suspension and traction method for the upper third of the femur, because the majority of fractures of the upper third are oblique. Oblique fractures tend to slip back into the old line of displacement.

The American Surgical Association reported on the results of fractures of the shaft of the femur as follows: 87 per cent of all cases treated by the closed method had a good functional result, and 42 per cent had a good anatomical result. By the open method, 77 per cent had a good functional result and 68 per cent had a good anatomical result.

Dr. Caldwell is right that not more than an hour should be required for doing an open operation.

In cases with marked shortening and deformity, we avoid open reduction. Our choice is always by skeletal traction.

In treating fractures of the shaft of the femur the keynote is correct traction and alignment.

Campbell, in his statistics of fractures of the shaft of the femur, reports 95 per cent of good results. Conwell, using skeletal traction, reports that 90 per cent of his patients were able to return to the same work as before the injury.

Dr. Highsmith (closing).—Brachial plexus nerve block anesthesia is practical, is easily performed and I have found it absolutely safe.

You cannot do harm with it if you are careful, pay attention to details, and do not inject the solution into a blood vessel. If you hit the subclavicular artery, you will do no harm, you will know that you are there, and you can withdraw the needle, change its direction and make the injection when you obtain the characteristic paresthesias.

The first rib, as I said, keeps you from entering the plural dome. I have entered the plural dome on two occasions and injected some novocaine into it, but never got any more than just a little irritation. The patient coughed a few times, but did not realize that there was anything wrong. He thought he coughed from bronchial irritation. The main advantage in this form

of anesthesia is that you get perfect muscular relaxation, and that is certainly what we are after in the reduction of fractures and dislocations.

Dr. Slocum (closing).—I have tried to avoid dogmatic opinions and to urge the importance of statistics. Our population in the South is still rural. If we get our statistics together we shall have something to talk about instead of each man's giving his own opinion.

SYNOVIAL FLUID IN INFECTIOUS AND NEUROPATHIC ARTHRITIS*

By A. R. SHANDS, JR., M.D.,
Durham, N. C.

The recent investigations on arthritis have included very little concerning the synovial fluid. Since 1893, when Max Schullen[1] first isolated a micro-organism from the joint fluid of a patient with chronic rheumatoid arthritis, the literature has contained only an occasional article on the subject. The cytology of this fluid has been more neglected than the bacteriology. The recent work of Key[2] on the cytology of synovial fluid in experimental arthritis is the most significant contribution of the later publications.

The author first started the aspiration of arthritic joints for bacteriological and cytological studies of the synovial fluid in March, 1927, and since this time has investigated the joint fluids of 125 patients. The data for the first series of 63 patients were collected while working in collaboration with Forkner and Poston at the Johns Hopkins Hospital and were published in the *Archives of Internal Medicine*.[3] All patients in this first series had a chronic infectious arthritis of non-tuberculous and non-syphilitic origin. Of the remaining 62 patients, 42 can be classified in this same group. The other 20 patients include ten neuropathic arthropathies, four cases of traumatic synovitis, four cases of acute gonorrheal arthritis, and two of miscellaneous grouping. The essential findings in the whole 125 patients will be given in this publication.

INFECTIOUS ARTHRITIS

There has been a total of 105 cases of chronic infectious arthritis studied. Fifteen of this number have shown proliferative bone changes about the joint margins, and may be classified as a hypertrophic type. There were 91 patients with multiple joint involvement and 14 with single joint involvement. In this latter group the arthritis had in many instances affected other joints, but at the time of examination was localized to a single joint. These monarticular cases included ten knees and four hips. An analysis of the cases as to sex shows 54 per cent in women and 46 per cent in men. The patients varied in age from fifteen to seventy-five years, the average age being forty-three and a half years. The duration of the arthritis at the time of the first examination was from two weeks to twenty-eight years, the average duration being three years. The patients presented various degrees of clinical activity in the joints. A great many were observed in an acute exacerbation of a chronic condition. The most probable sources of infection in order of frequency were found to be: tonsils, teeth, gastro-intestinal tract, and sinuses.

The most interesting and important studies of the synovial fluid have undoubtedly been the bacteriological investigations. Cecil, Nichols and Stainsby,[4] in their recent review of literature on arthritis, have summarized the general results of the experimental findings in the statement: "Unfortunately efforts to recover bacteria from the joints themselves have not been consistently successful." On the contrary, our investigations have met with unusual success in this field. The majority of the organisms recovered from the synovial fluid have been streptococci of the same strains, as those which Cecil,[4] Burbank,[5] Rosenow[6] and others have recovered from the blood and joints of patients with chronic infectious arthritis.

Streptococci have been cultured from 28 joints of the 105 patients, or 26.7 per cent. These are divided as follows: 23 of the viridans type, four of the non-hemolytic type, and one of hemolytic type (*Chart I*). The organism which Cecil, Nichols and Stainsby[4] have isolated in blood cultures from 61.5 per cent of 78 cases has been identified as an attenuated strain of the hemo-

CHART I

The Bacteriology of the Synovial Fluid in 105 Cases of Chronic Infectious Arthritis

	No. of Organisms	Per Cent of Total Org.	Per Cent of Total Cases
Streptococcus	28	70	26.7
Viridans	23	57.5	
Non-hemolyticus	4	10	
Hemolyticus	1	2.5	
Staphylococcus	10	25	9.5
Aureus	5	12.5	
Aureus hemolyticus	1	2.5	
Albus	4	10	
Gonococcus	2	5	1.9
Total	40	100.%	38.1%

*Read in Section on Bone and Joint Surgery, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

*From the Department of Orthopedic Surgery, Duke University School of Medicine.

lytic streptococcus. They have stated that some of these organisms in the first cultures have shown properties of a viridans streptococcus, but on subculturing through many generations on artificial media they take on definite hemolytic qualities. We believe it to be likely that many of the viridans strains here recovered from the joints might have shown these same properties if all the cultural characteristics had been studied. There were 40 positive joint cultures obtained in the total 105 cases, or 38.1 per cent.

The remaining organisms recovered were ten of the staphylococcus type and two of the gonococcus type. These latter occurred unquestionably in chronic arthritis of gonorrheal origin. The ten staphylococci were divided as follows: five aureus, one aureus hemolyticus, and four albus. When a staphylococcus appears in cultures of this character, there is always the question of contamination. The principal argument against this possibility is the slow appearance of the organisms on the media. Contaminating organisms usually make their appearance within the first twenty-four hours, and have a very luxuriant growth. On the contrary these staphylococci took as long to appear on the media as the streptococci, namely, from four to twenty-six days and were extremely difficult to grow on subcultures of blood agar. There was no difference between the aureus and albus strains. Burbank and Hadjopoulos[5] have reported the isolation of five *Staphylococcus aureus* organisms from the blood in a series of 145 cases of arthritis. Cecil, Nichols and Stainsby[4] speak of an occasional blood culture's showing a *Staphylococcus albus*. In our series the *Staphylococcus albus* was recovered in one instance from two separate joints, and in a second instance from a joint and a regional lymph node draining this joint. We were first inclined to discard the *Staphylococcus albus* cultures, but because of the great similarity of this organism to the *Micrococcus deformans* described by Crowe,[7] the cultures have been included in the series. Crowe believes that the *Micrococcus deformans* is the main etiological factor in all infectious arthritis. We are of the opinion that the relationship of the *Staphylococcus albus* to the pathological changes of infectious arthritis is questionable. It is interesting that five of the six *Staphylococcus aureus* cultures were in patients with a single joint involvement. It may be that this organism is responsible for a great many monarticular cases of arthritis, and in this respect is similar to the gonococcus.

It is thought that a large measure of the success with these cultures has been due to several factors: first a careful selection and preparation of suitable media; secondly, the direct implantation of the joint fluid on the media; and thirdly, the placing of this culture immediately into the incubator. The cultures were examined daily and were not discarded for thirty days. As soon as a growth appeared a subculture was made on human blood agar plates. The following media were found to be the most satisfactory for the growth of the organisms from the joints: beef infusion dextrose agar and broth, ascitic fluid dextrose beef infusion agar and broth, calcium carbonate placenta infusion broth, and placenta infusion dextrose brain broth. All media were adjusted to a pH. of 7.4 to 7.6. The beef infusion media were used in the Johns Hopkins Laboratory in culturing the 63 joint fluids in the first series. In addition the placenta infusion media were used in the George Washington University Laboratory. The greater number of organisms were grown with the use of the latter media. In the first series of 63 cases the percentage of positive cultures was 22, while in the second series of 42 cases the percentage was 61.9.

The study of the cells in the synovial fluids is almost a new field of investigation, so little has been recorded on the subject. Key,[2] in a recent publication on synovial fluid in experimental arthritis, has given an excellent description of the same types of cells which we have found in the joint fluid of arthritic patients. In the first series of joints studied at the Johns Hopkins Hospital the cellular elements were examined with the supravital technic for the study of the living cells, as described by Sabin.[8] These studies were performed entirely by Forkner. In the second series the fixed film preparations were used. Several laboratory technicians performed the cytological examinations. There were a total of 60 synovial fluids examined from 46 joints (*Chart II*). Twenty-three fluids were

CHART II

The Cytology of the Synovial Fluid in 46 Cases of Chronic Infectious Arthritis

	Jts. With Pos. Cul.	Jts. With Neg. Cul.	Total Jts. Cult'd
Number of Cases	16	30	46
Average White Cell Count (Cells per cu. mm.)	8,109	5,144	6,175
Average Differential (%)			
Polymorphonuclears	65.7	61.4	56.4
Lymphocytes	20.	30.3	26.7
Monocytes	11.	15.4	13.9
Clasmatocytes	2.1	2.3	2.2
Mesothelial Cells	1.	0.5	0.7

from 16 joints which had positive cultures, while 37 fluids were from 30 joints which had negative cultures. The average white cell count was distinctly higher in the joint fluids with positive cultures. There were 8,100 cells per cu. mm. in the fluid of the positive cultures compared to 5,100 cells in the fluid of the negative cultures. The polymorphonuclear leucocytes were 15 per cent higher in the positive joints than in the negative ones. The mononuclear elements (lymphocytes and monocytes) were 14 per cent higher in the negative joints than in the positive joints. The highest total white cell counts were always found in those joints which were clinically the most active. However, the cultures of these joints were not always positive. As the white cell counts increased, the percentage of polymorphonuclears also increased.

There were four patients studied who had a synovitis of the knee following trauma. The symptoms of swelling and extreme discomfort did not follow immediately the initial injury, but came on gradually several days later. Two of these four cases had positive joint cultures and have been previously reported.[9] One positive culture was an atypical strain of *Staphylococcus aureus,* which took 15 days to appear on the culture media. The second positive culture was a *Streptococcus viridans,* which took 20 days to appear on the media. All synovial fluid aspirated in this group of cases had an extremely turbid straw colored appearance. The average white cell count was 8,200 cells per cu. mm. with 73 per cent polymorphonuclear leucocytes, 20 per cent lymphocytes, 5 per cent monocytes, 2 per cent clasmatocytes, and 5 per cent mesothelial cells. The cell counts of the two joints with positive cultures were distinctly higher than the average for the group, but the polymorphonuclears were 3 per cent lower than the average.

There were four joints studied which were clinically monarticular cases of acute gonorrheal arthritis. These included a wrist, hip, knee, and ankle. The patients had an acute gonorrheal infection at the time of examination. The gonococcus was recovered from the joint fluid in all cases except the knee. The culture from the ankle in addition to the gonococcus had a definite growth of *Streptococcus viridans.*

This patient was suffering from an acute sore throat associated with an acute urethritis. It is a rather interesting and unusual observation to recover two such organisms from one joint fluid. The fluid was in this case extremely thick and cloudy, but in no way resembled frank pus. This patient had a negative blood culture, but had a positive blood Wassermann. The knee joint was the only case in which enough fluid was recovered for cytological studies. The white cell count on this fluid was 27,250 cells per cu. mm. with 89 per cent polymorphonuclears, 10 per cent lymphocytes, and 1 per cent monocytes.

There were two additional joint fluids investigated in this infectious group, which are considered to be of sufficient interest to report. One patient was a colored man of twenty-seven years, who for three months had had a painful swelling on the dorsum of the anterior portion of his right foot. During this time he had been suffering from a sore throat. X-rays of the foot and blood Wassermann were both negative. This swelling was aspirated and a few drops of thick, stringy yellow fluid were obtained, which showed a *Streptococcus viridans* in pure culture.

The second patient was a colored girl of thirty years, who for a period of twelve months had been suffering with intermittent pain, swelling, and weakness in the right knee. During this time she had had an occasional sore throat and cold. X-rays of the knee and blood Wassermann were again negative. The clinical impression was of an early tuberculous synovitis. However, this was not proved either by guinea pig inoculation with the joint fluid or biopsy. About 5 c. c. of a very cloudy turbid yellow fluid with small flakes were obtained on aspiration. The culture of this was negative. The white cell count was 28,000 cells per cu. mm. with 56 per cent polymorphonuclears, 38 per cent lymphocytes, 2 per cent monocytes, and 4 per cent clasmatocytes.

NEUROPATHIC ARTHRITIS

A study has been made of the joint fluids of eleven neuropathic arthropathies in ten patients. Nine of these patients had definite tertiary syphilis and the joints were undoubtedly of the Charcot[10] type (*Chart III*). It was thought that a comparative study of these synovial fluids with those of chronic infectious arthritis might be of interest. Both bacteriological and cytological examinations have been made.

The development of nine of the ten Charcot joints was preceded by trauma, either in the nature of a strain, twist or direct blow. There were seven knees, two shoulders and one elbow. One patient had two Charcot knees. The eleventh joint was an ankle, which developed this painless disintegrative arthritis following a peripheral nerve lesion. This latter case has previously been reported.[11] The average age was forty-eight years. There were six men and four women. Eight of the nine patients with Charcot joints showed either a positive blood or spinal fluid Wassermann or both. The one case which had both blood and spinal fluid Wassermanns negative showed all the clinical symptoms of tabes dorsalis, and was believed to be unquestionably one of tertiary syphilis with neurological changes. Only one of four joint fluid Wassermanns was positive. All cases showed x-ray

CHART III

The Bacteriology and Cytology of the Synovial Fluid in 10 Charcot Joints

Case No.	Age	Sex	Duration	Joint Affected	Culture	Wassermann Bl.	SpF.	SynF.	Cell Ct. per cu.mn.	Pmn. %	Lym. %	Mon. %	Clas. %	Mes. %
1	33	F	6 yrs.	Knee	1. Negative 2. Negative	+			2,200	65	30	4	1	
2	50	M	1 yr.	Knee	1. Strep. non-hem. 2. Strep. non-hem. 3. Strep. non-hem. 4. Strep. viridans	+		0	980 1,180 12,000	50 17 Not done 58	13 78 36	15 3 5	 2	22
3	50	M	8 mos.	Knee	1. Strep. viridans 2. Negative	0	0	0	Not sufficient cells					
4	40	F	6 mos.	Shoulder	1. Staph. aureus	0	+		17,060	48	49	1	1	
5	65	M	1 mo.	Knee	1. Negative	0	+	0	550	91	8	1		
6	70	F	3 mos.	Rt.Knee Lt.Knee	1. Negative 2. Negative	+	+		100 240	72 77	26 22	2 1		
7	29	M	1 mo.	Knee	1. Negative	+	+		350	64	35	1		
8	50	M	5 mos.	Shoulder	1. Negative	+			Not sufficient cells					
9	48	F	4 mos.	Elbow	1. Negative	+	+	+	200	10	88	2		
								Average	3,178	58	38	2.2	0.3	3.1

changes characteristic of neuropathic arthropathies, namely: bone destruction, bone proliferation, osteosclerosis, osteoporosis, irregular shaped bone sequestration, and so forth.

There were organisms recovered from three of the ten Charcot joint fluids. No reports can be found in the literature of isolating microorganisms from synovial fluid of this character, although the reports of many negative cultures have been made.

The first positive culture obtained from Charcot joint fluid was a non-hemolytic streptococcus. Second and third cultures performed three and four weeks later on the fluid from this same joint revealed the identical organism. On the fourth attempt to cultivate an organism, which was four months after the initial culture, a streptococcus was recovered, but this time it had definite viridans characteristics. The appearance time of the streptococcus in all four cultures was from seven to ten days. The second positive Charcot joint culture was a *Streptococcus viridans*. This organism could not be isolated in a second culture two months later. The third positive culture was from a shoulder. The organism was a *Staphylococcus aureus*, which took five days to make its appearance on the culture media. The synovial fluid from the neuropathic arthropathy of the ankle due to a peripheral nerve lesion showed a *Staphylococcus albus* in pure culture on two occasions. This organism took three and four days to make its appearance on the media, and was not considered a contaminant.

It is a well known fact that in traumatic arthritis organisms will lodge in and about the traumatized joints from foci of infection to set up an inflammatory process. It is reasonable to believe that in these weakened joints due to an involvement of the sensory nerves a secondary blood stream invader will find its way to the peri-articular structures. Once the organism has established its new location it is quite likely that it takes a definite part in the continuance of the low grade inflammatory reactions at these points.

The physical properties of Charcot joint fluid have been well described by Henderson.[12] He has stated that the synovial fluid is usually clear and pale yellow; in some cases it may be darker and redder; and in a few cases there may be a large admixture of blood. Four of the 10 Charcot joint fluids had a distinct reddish color. Two of these four, although the amount of fluid aspirated was 100 c. c. or more, did not have sufficient cells present to perform a white cell count and differential. The eight Charcot joint fluids examined had an average white cell count of 3,200 cells per cu. mm. The average percentage polymorphonuclear leucocytes was 57.7, basophils 1.3, lymphocytes 38, monocytes 2.2, clasmatocytes 0.3, and mesothelial cells 3.1. The neuropathic arthropathy of the ankle due to a peripheral nerve lesion had a white cell count of 32,000 cells per cu. mm. with polymorphonuclear neutrophils of 51 per cent, basophils 2 per cent, lymphocytes 41 per cent, and mesothelial cells 6 per cent. The four joint fluids having the positive cultures showed by far the highest cell counts in the group, but the average percentage of the polymorphonuclears was 12 per cent lower than the average for the group. Apparently in this type of joint, as the number of white cells increase, the polymorphonuclears decrease, and the mononuclear elements increase. The total white cell count and

differential in this group is quite similar to that in the chronic infectious arthritic group with negative cultures.

SUMMARY AND CONCLUSIONS

A report of the bacteriology and cytology of the synovial fluid in 125 cases of arthritis is given.

There were 105 patients with chronic infectious arthritis. Streptococci were recovered from the synovial fluid in 26.7 per cent of this number. The total percentage of positive joint cultures was 38.1. Of the 28 positive cultures of streptococci, 23 were of the viridans type. The average white cell count and the average percentage of polymorphonuclears was distinctly higher in the group in which positive cultures were obtained.

Studies were made on the synovial fluid of four acute gonorrheal joints, four joints with acute synovitis, and two infectious joints of miscellaneous grouping.

There were ten patients with neuropathic arthropathies, nine of which had definite Charcot joints. Bacteria were recovered from the synovial fluid of four of this number. Two of the three positive Charcot joint cultures were *Streptococcus viridans*. The cytological studies in this group were very similar to those of the chronic infectious arthritic joints with negative cultures.

*Appreciation is expressed to Dr. Oscar B. Hunter of the George Washington University Medical School, in whose laboratory the second half of the studies on the synovial fluid were performed and to his two technicians, Mr. Schnauffer, and Mr. Berger.

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DISCUSSION (*Abstract*)

Dr. George E. Bennett, Baltimore, Md.—In my experience in orthopedic surgery, there are two conditions with which we have done very little: chronic arthritis and neuropathic arthritis.

Dr. Shands has identified the organisms to be found in Charcot joints. He has been able to make some basic studies which I think are of value.

It seems to me that I do not know of any disease that has gone through more types of treatment than chronic arthritis has. As I go back twenty years, my first interest was stimulated when Dr. Macon, of New York, and a group of New York men were sure they were going to be able to cure arthritis. Then, my interest was also stimulated by Dr. Gibney, who went South and obtained from our friend, Dr. Hoke, a supply of Kiefelake, which I dispensed for Dr. Gibney for a number of years.

Then, shortly after, followed the stage of pulling all of the teeth, which lasted over a period of fifteen or eighteen years.

If we do not succeed in getting cultures of various types from these cases probably it is our technic.

Dr. Isidore Cohn, New Orleans, La.—Dr. Shands has been careful to give credit to previous workers.

The work of Key, we might call the Key work on which practically all of the cytological work is now being done.

One of the outstanding points I get from Dr. Shands' work is the result of the aspirations of joints, the differential counts in infected and in non-infected joints.

Burbank in New York has found practically the same type of organisms in the stools as in the blood cultures of the individuals who have joint infection.

What the average physician can do is to find the focus of infection and make a vaccine from it. If he can isolate the same organism from the joint as from the various foci, he should use vaccine therapy.

Dr. Custis Lee Hall, Washington, D. C.—I am associated with Dr. Shands in Washington in a general way, using the same laboratory and the same technic. The results during the last two years have certainly been very much more satisfactory than they were previously.

I have also gotten several cultures from the knee of one boy, who promptly recovered following the use of *Staphylococcus aureus* culture.

We have gotten a great deal of information from Dr. Shands' work and I believe the main difficulty in the past has lain in the technic of the laboratory work.

Dr. Shands (closing).—If any one present is interested in trying to obtain positive joint cultures, I shall be very glad to talk with him concerning the details of the work.

EMPYEMA IN CHILDREN: REPORT OF THIRTY-SIX CASES TREATED BY TIDAL IRRIGATION AND SUCTION*

By DERYL HART, M.D.,
Durham, N. C.

Since the institution of tidal irrigation in the treatment of empyema there has been a great improvement in the results obtained in this clinic. Not only has the mortality been reduced from 40 per cent to less than 10 per cent in children two years of age and under, but the convalescence has been greatly shortened. No patient has developed a chronic empyema and no patient has left the hospital with a draining sinus. Only one patient has, after discharge from the hospital, developed a complication referable to the former empyema. This was a chest wall abscess, coming on seven months after discharge, in a two year old patient, who had an osteomyelitis of a rib complicating an empyema caused by the *Staphylococcus aureus*. The abscess promptly healed following incision and drainage and there has been no subsequent trouble.

During this period of twenty-two months from November, 1927, to September, 1929, we have treated 40 children (upper age limit 15 years) for empyema. Thirty-six of these had a cavity sufficiently large to permit the use of tidal irrigation, while four had one or more small pockets and were treated by the simple insertion of a drainage tube (see *Chart I*). This paper will be based on an analysis of the 36 cases treated with tidal irrigation. A comparison will also be made between the results obtained among the group of children two years of age and under treated by this method and those treated between 1915 and 1927[1] by rib resection and open drainage, or trocar thoracotomy and closed drainage. The method of treatment has already been adequately described,[2-5] but it cannot be too frequently emphasized that the best results are obtained only by a careful supervision of every case, and by the proper application of the physics of irrigation and suction to the pathology of the empyema, the anatomy of the chest, and the physiology of respirations. The following aims in treatment should always be kept in mind: (1) to keep the cavity open until the pus has been washed out and the infection in the wall of the cavity has subsided; (2) gradually to obliterate the cavity by suction, at the same time distending it periodically to prevent pocketing; (3) to insert the tube in such a manner that any fluid which escapes around the tube through the opening in the parietal pleura shall have free drainage to the surface. The tube should not be inserted obliquely and the opening in the skin should not fit too tightly around the tube. The place to prevent leakage is at the parietal pleura and not at the skin, since under the latter conditions we favor extravasation of pus, the formation of a chest wall abscess, septicemia, and metastatic infections.

CHART I

Total Number of Patients Treated From Nov. 1, 1927-Sept. 1, 1929

	Number	Duration Irrigation or Drainage	Deaths
With Tidal Irrigation	36	20 days	5*
Without Tidal Irrigation	4	23 days	0
TOTALS	40		5*

*One of these patients died after being taken from the hospital.

The apparatus, as previously described, may on superficial examination appear complicated. The simplest and at the same time a very efficient irrigation apparatus consists of a flask, half filled with a sterile non-irritating solution, connected by means of an opening near the bottom to the outer end of the catheter which enters the chest. A small amount of suction can be obtained by placing the flask dependent to the empyema cavity. The remaining parts of the more complicated apparatus have been added in order more efficiently to wash out the pus, and at the same time to simplify the post-operative care consisting of a renewal of the irrigating fluid and adjustment of suction. When once set up, the apparatus can be used over and over again, and is easily operated by a nurse. The ease of operation, together with the satisfaction of accurate adjustment, more than compensates for the labor of the first set-up.

Most of the patients (72 per cent) were five

*Read in Section on Pediatrics, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

*From the Department of Surgery, Duke University School of Medicine.

CHART II

Age Groups of Patients treated by tidal irrigation, giving number of patients, deaths, complications, leakage about tube and duration of irrigation.

Age Groups	No. of Patients Recovered			No. of Patients Dead			No. of Patients		Leakage Around Tube	Duration of Irrigation in Days
	Right Side	Left Side	Bilateral	Right Side	Left Side	Bilateral	With Complications	Without Complications		
0-9 mos.	2	5	0	0	1*	0	7	1	4	26
10 mos.-2 yrs.	1	5	0	0	0	1	4	3	2	18
3-5 yrs.	4	5	0	0	0	2	6	5	2	19
6-10 yrs.	2	2	0	0	0	1	4	1	1	18
11-15 yrs.	1	4	0	0	0	0	2	3	0	18
TOTALS	10	21	0	0	1	4	23	13	9	
	31			5			36			

*Died after being taken from the hospital.

years or less of age, while 42 per cent of them were in the group two years of age or under (*Chart II*). Since in general the mortality is much higher in the younger patients, this fact should be kept in mind in considering these statistics. The side on which the empyema is located may bear some relationship to the mortality. Naturally the patient with a bilateral empyema is a much more serious risk than the one with a unilateral empyema. Of the ten patients with an empyema on the right side, all recovered. One of the twenty-two patients with an empyema on the left side died at home after being taken from the hospital against advice. This case is of no value from a statistical point of view to prove that the empyema on the left side is more serious than the one on the right side. However, if it be true that the empyema on the left is more serious, the low mortality in this series of cases is more striking, since 70 per cent of the unilateral empyemas were on the left.

Complications.—The number of complications has been unusually high, 64 per cent of the patients having one or more (*Charts II* and *III*). A detailed list of the complications is given in *Chart III*, and it can be seen that most of them had no relationship to the method of treatment. Many of the complications were the result of a generalized infection and were present at the time of operation (*see Chart VII*). As the infectious diseases occurred in a nursery free of such a disease at the time, an exposure must have occurred before the time of admission.

The duration of irrigation depends upon the time of application of suction and upon the amount used. In the acute cases we apply very little, if any suction, for the first seven days, and at times use a small amount of positive pressure during this period. This prevents a collapse of the cavity before the pus has been washed out and the infection brought under control. Such treatment naturally prolongs the period of irrigation and is responsible for the leakage about the tube in a number of cases. On the other hand, we feel that this slow obliteration of the cavity decreases the chance of pocketing of the empyema by the too early apposition of infected surfaces. As long as any fluid which leaks through the parietal pleura has a free exit to the surface it can cause no damage other than to increase the nursing care and require changing of superficial dressings. After five to seven days have been allowed for the clearing up of the infection, and if at that time leakage has started, it can usually be controlled by proper regulation of the amount of the suction and adjustment of the position of the tube. The suction must be kept up for about five days after all irrigation has stopped in order to insure sufficiently strong adhesions between the lung and the chest wall to prevent a reformation of the cavity after suction is discontinued (see *Chart III*). The duration of irrigation as given in *Chart II* includes this additional period of suction. A further precaution to prevent a reformation of the cavity is, after discontinuance of suction, to place the outer end of the drainage catheter below the surface of sterile fluid which is kept dependent to the cavity. This allows drainage, but prevents the inflow of air or fluid. In the presence of a temperature caused by one

CHART III

COMPLICATIONS

	Number of Cases	
	Recovery	Death*
A. Not Referable to Method of Treatment		
Extending or recurring pneumonia	4	3
Bilateral pneumonia	5	4
Bronchiectasis and chronic lung infection	1	
Bilateral empyema		4
Multiple small pockets		1
Lung abscess		1
Abscess chest wall (from pre-operative aspirations)	5	
Pericarditis		2
Peritonitis		2
Septicemia		2
Metastatic abscesses (not included under septicemia)	3	
Meningitis		1
Pyarthrosis		1
Bronchial fistula	5	
Otitis media, bilateral	7	
Mastoiditis acute with operation	1	
Severe skin infection (impetigo and furunculosis)	2	
Pyelitis	2	
Measles	1	
Mumps	1	
Pertussis	1	
Diphtheria (one case with associated myocarditis)	2	
Acute intestinal indigestion	1	
Nutritional disturbance severe (one case with generalized edema)	2	
Syphilis	4	
Removed from hospital when critically ill		1
Brain abscess (included under metastatic abscesses)	1	
B. Referable to method of treatment		
Suction removed too early, cavity reformed	1	0
Osteomyelitic ribs (abscess chest wall 7 months after discharge in 1 case)	2	0

*Total deaths five, four in hospital and one after being taken home against advice.

of the complications, noted in *Chart III*, we hesitated to remove the tube until we were sure that there was no walled off infection which might rupture into the drainage tract. The tube was usually left in place for several days, but occasionally for several weeks, the average time being twelve days. No patient, however, developed an abscess along the drainage tract, and the sinus in every case healed within five to six days after removal of the tube.

The classification of the cases, according to the infecting organism as shown in *Chart IV*, would indicate that those patients infected with pneumococci of Type IV, staphylococci or streptococci, have a better chance of recovery than those infected with the pneumococcus of Type I, or the influenza bacillus. We had always considered an empyema caused by the staphylococcus or the streptococcus as relatively more serious than these statistics indicate.

Massive empyemas, filling one entire pleural cavity, were the usual type in this series (see *Chart V*). In our experience with this method

CHART IV

Classification of Cases According to Organism

Organism	No. of Cases	No. of Deaths
Pneumococcus		
Type I	4	2
Type II	3	0
Type III	0	0
Group IV	11	1*
Not typed	4	0
Staphylococcus		
Aureus	6	0
Citreus	1	0
Streptococcus		
Hemolytic	5	1
Non-hemolytic (Viridans 1)	2	0
Colon bacillus	1	0
Influenza bacillus	1	1
No record	2	0
TOTAL	40	5

Several cases had mixed infections accounting for more than 36 organisms isolated.

*Patient died after being taken from hospital against advice of physicians.

CHART V

TYPE OF EMPYEMA

	No. of Patients	
	Recovered	Dead
Massive	29	5*
Single Pocket Large	1	0
Multiple Pockets	1	0
Small Pockets	4 (Not treated by tidal irrigation)	

*One of these patients died after being taken home against advice.

CHART VI

Condition of Patient at Time of Operation with Results for Each Age Group.

Age	Good or Fair		Poor or Critical			Moribund		
	Recovered	Died	Recovered	Died	Post Operative time of death	Recovered	Died	Post Operative time of death
0-9 mos.	2	0	5	0		0	1*	After 8th day
10 mos.-2 yrs.	1	0	5	1	9 days	0	0	
3 yrs.-5 yrs.	4	0	5	0		0	2	12 hrs. 17 days
6 yrs.-10 yrs.	2	0	2	1	48 hrs.	0	0	
11 yrs.-15 yrs.	3	0	2	0		0	0	
TOTALS	12	0	19	2		0	3	

*Taken home against advice of doctors on eighth day after operation.

of treatment, these cases are particularly satisfactory since the tube is easily inserted so as to give free irrigation. The small pockets, on the other hand, are more difficult to locate, the tube is more apt to be kinked, and with multiple pockets one can never be sure when the last one is adequately drained.

The condition of the patient at the time of operation, as shown in *Chart VI,* is only a relative thing, usually an impression expressed by the physician in charge of the case. In some cases this classification had to be made from a review of the history. Most of the patients were acutely ill both with pneumonia and empyema, and were considered to be in a serious condition. The patients classed as moribund were comatose and apparently on the verge of death, with little or no hope held out for their recovery. In one such case, shown in *Chart VII,* the patient lived for seventeen days, and at one time seemed well on the road to recovery. This encourages us to keep on trying to save every patient, regardless of how poor the outlook.

Empyema in Children Two Years of Age and Under.—This particular group is given special consideration since they are the poorer risks, the reported mortality having ranged from 30 to 70 per cent in various publications. We have had 15 cases in this age group with a hospital mortality of 7 per cent or a total mortality of 14 per cent (one patient died at home after being taken from the hospital against advice) as compared with 40 per cent during the preceding twelve years. Between May, 1915, and June, 1927, 46 patients in this same age group were operated upon for empyema in the Johns Hopkins Hospital. Twenty-two of these had a trocar thoracotomy and closed drainage with a mortality of 50 per cent, while the other 24 patients had a rib resected and open drainage with a mortality of 29 per cent. The low mortality rate in this group of patients treated by tidal irrigation is the more striking when one considers that during the twenty-two months that this method of treatment has been in use all patients were operated upon as soon as a diagnosis was made, and no patient came to autopsy with a frank empyema which had not been diagnosed and drained.* In the preceding twelve years, when the mortality among the operative cases was 40 per cent, out of 80 cases of empyema in small children 20 were discovered at autopsy. There were twelve other patients in whom the diagnosis was made by a thoracentesis and no operation was performed. Three went elsewhere for treatment, one recovered, while six of the eight deaths occurred within forty-eight hours after the diagnosis was made.

Taking all cases of empyema in these small children, whether diagnosed or undiagnosed, treated or untreated, from 1915 to 1927, the hospital mortality was 63 per cent. From November, 1927, to September, 1929, with more accurate diagnoses by the pediatrician, early operation and treatment with tidal irrigation, the hospital mortality has been 7 per cent. From *Chart VIII* one can see that all the factors which tend to give a higher mortality, such as the presence of complications, infections with organisms other than the pneumococcus, the lo-

*We have been able to find in the autopsy records of the past two years only one case of fibrinous pleurisy and no case of empyema with free fluid which had not been diagnosed.

CHART VII

Analysis of Five Fatal Cases

Age	Side	Organism	Condition of Patient at Time of Operation	Time of Death After Oper.	Condition at Autopsy	
					Local	General
15 mos.	Right and Left	Influenza bacillus	Critical, bilateral pneumonia. Empyema right side.	9 days	Clean, granulating cavity on right (side drained).	Empyema, left, untreated. Bilateral pneumonia. Meningitis, pyarthrosis. Septicemia (all influenza bac.).
3 yrs.	Right	Hemolytic strepto-coccus	Critical. History of measles, mumps, and pneumonia in rapid succession. Empyema for two months. Bronchial fistula 3 days. Loss 16 lbs. wt.	29 days	Empyema, right side, healed except for sinus.	Bilateral pneumonia. Bilateral empyema, pericarditis, peritonitis (all infections except the empyema on right side caused by the pneumococcus Type I).
	Left	Pneumo-coccus	Fresh pneumonia, bilateral, pneumococcus type I 7 days. In oxygen tent. Moribund, operation without anesthetic.	12 hrs.	Empyema cavity, left side contained fibrin and 15 c. c. of fluid.	
10 yrs.	Left	Hemolytic strepto-coccus	Critical, Peritonitis Septicemia. (Innumerable colonies of Hem. strep. in blood culture.)	2 days	Empyema cavity on left side practically obliterated (side drained).	Bilateral empyema, pneumonia, pericarditis, peritonitis, septicemia (all caused by hem. strep.).
9 mos.	Left	Pneumo-coccus Group IV	Moribund. (Note made by pediatrician.)	Taken from hosp. 8th day. Died at home	Autopsy Not Obtained	When patient was taken from hospital there were signs of extensive pneumonia, bilateral.
3 yrs.	Right	Pneumo-coccus Type I	Critical. Extensive bilateral pneumonia.	23 days	Clinically there was continuous improvement for 15 days after the second operation. Out of oxygen tent and breathing without distress. Two days before death onset of extensive fresh bilateral pneumonia, and rapid downward course.	
	Left	Pneumo-coccus Type I	Moribund. In oxygen tent, operation performed without anesthesia and without response.	17 days		

cation of the empyema on the left side, or the poor condition of the patient at the time of operation were more frequently present in the group of cases treated by tidal irrigation than among those treated by other methods.

*Results.**—Of the 40 patients treated, four died in the hospital, giving a mortality of 10 per cent. During this same period of time no patient with a diagnosis of empyema died without operation. *Chart VII* shows that two of these four patients were moribund at the time of operation, the third had a heavy blood stream infection with the hemolytic streptococcus, while the other patient, critically ill with a bilateral pneumonia and empyema, was infected with the influenza bacillus. There is a high mortality rate both for pneumonia and empyema when the influenza bacillus is the etiological agent. Probably all these patients had a generalized infection, this being demonstrated in the ones on whom an autopsy was performed.

We feel that the results in other respects are as striking as the reduction in the mortality rate. The time of hospitalization for the empyema was shortened, no patient left the hospital with a draining sinus, and no patient developed a chronic empyema. There were only three complications referable to the method of treatment, the reformation of the cavity following the too early discontinuance of suction in one case, while two patients developed an osteomyelitis of the rib. This latter condition

*One patient, given throughout the records as cured, died of a fresh pneumonia after being discharged as cured of empyema. The complete pathological diagnosis is given: "Dense fibrous pleura left (empyema and drainage tract healed), slight atelectasis left lung due to thickened pleura. Fresh lobular pneumonia and fibro-purulent pleurisy, right (very small amount of fluid), pericarditis (fresh shaggy fibrinous exudate), peritonitis, meningitis. (Pneumococcus) emaciation (age 11 months, weight 4.5 kilograms)." This patient is one of the two noted in Chart III as having a severe nutritional disturbance and was under care of pediatricians for this when the second attack of pneumonia occurred.

CHART VIII

Patients Two Years of Age and Under. Comparison with Former Methods of Treatment

	May 1915-June 1927				Nov. 1927-Sept. 1929	
	Rib Resection with Open Drainage		Trocar Thoracotomy with Closed Drainage		Trocar Thoracotomy with Tidal Irrigation	
	No. of Cases	Hospital Mort. %	No. of Cases	Hospital Mort. %	No. of Cases	Hospital Mort. %
Total number cases	24	29	22	50	15	7*
With complications	3	100	11	82	11	10
Without complications	21	17	11	12	4	0
Pneumococcus infections	13	8	13	50	6	0
Other organisms Strep. Staph., Inf. Bac.	7	57	8	63	9	11
Empyema on right side	11	20	12	36	3	0
Empyema on left side	13	36	10	60	11	0
Empyema on both sides					1	100
	Per cent of cases in group having rib resection.		Per cent of cases in group having trocar thoractomy.			
Good or fair condition	52	33	48	27	3	0
Poor condition	52	25	48	73	13	8
Under one year of age	45	30	55	58	9	0
1-2 years of age	58	29	42	40	6	17

*Counting the patient who died after being taking home against advice this mortality per cent would be 14.

in both cases was discovered by x-ray examination. In one patient there have been no symptoms, while in the other a subcutaneous abscess developed after seven months. This healed promptly following drainage and has given no further trouble.

SUMMARY

Thirty-six children (fifteen years or less of age) have been treated by tidal irrigation with five deaths (four in hospital and one after being taken home against advice when critically ill). All of the fatal cases were in a serious condition at the time of operation, while four of the five were apparently hopeless (*Chart VII*).

Each of the four patients who died in the hospital had a bilateral empyema.

The larger number of patients were in the younger age groups (72 per cent five years of age or less) where the mortality is usually high.

Fifteen of these patients were two years of age or younger, with one death in the hospital, giving a hospital mortality of 7 per cent. No patient in this age group came to autopsy with an empyema which had not been diagnosed and drained. In this same age group during the preceding twelve years there was a 40 per cent mortality among operative cases, 25 per cent came to autopsy undiagnosed and 10 per cent died without operation, after a diagnosis had been made by thoracentesis.

The organisms were diverse, the pneumococcus Type I and the influenza bacillus apparently causing the most serious infections.

The complications not referable to the method of treatment have been numerous, diverse, and often multiple.

The complications referable to the method of treatment have been almost negligible.

One patient developed a superficial abscess, secondary to an osteomyelitis of the rib, seven months after discharge from the hospital. No other patient has shown any trouble or symptoms referable to the empyema.

No patient has been discharged from the hospital with a draining sinus.

The duration of the drainage has been greatly reduced.

No patient has developed a chronic empyema.

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DISCUSSION (*Abstract*)

Dr. Horton Casparis, Nashville, Tenn.—During the past four or five years we have treated quite a number of children with empyema, using a method similar to Dr. Hart's, and I have also had an opportunity to observe the treatment of some of Dr. Hart's patients. It is most encouraging to see how much better results are obtained with these methods than were obtained formerly with the old open drainage method. In those days empyema in a child was a very serious condition. Now it us unusual for us to have a death from empyema, and more than that, the course with the present treatment is relatively short, while formerly it was a long drawn out affair at the best.

Dr. D. Lesesne Smith, Spartanburg, S. C.—I should like to ask Dr. Hart if one can buy this apparatus on the market, and from whom? If not, where can we get the cuts so as to be able to avail ourselves of the opportunity of using it in our cases?

Dr. R. G. Doughty, Columbia, S. C.—The criticism has been made that Dr. Hart's apparatus is too complicated, and I made the observation to him yesterday that the cuts in his original article were not entirely clear to me. However, the apparatus is not complicated and could be made up easily in most hospitals.

Dr. Hart's results with the children in whom there have been complications have certainly been brilliant and in marked contrast with the results previously obtained, particularly in those cases with a bilateral involvement.

Dr. Hart (closing).—As this work has been in the experimental stage many types of apparatus have been used, and we find it satisfactory to assemble the particular things needed for each case. I have never ordered special equipment, but have used what was available in the laboratories, pharmacy, or surgical supply room.

In the absence of a bronchial fistula, the simplest and at the same time an entirely satisfactory apparatus consists of a 500 c. c. flask, with an opening near the bottom, connected with the chest by a tube. For irrigation, the partly filled flask is placed on a level with the chest, while for suction to obliterate the cavity the flask is lowered 1 to 2 cm. a day until irrigation ceases.

In the presence of a bronchial fistula a water suction pump is necessary to remove the air faster than it leaks in through the fistula. It can be connected with the irrigation flask by a rubber tube, and any type of release valve may be inserted to regulate the maximum suction. The irrigation flask can be emptied and refilled by whatever method is easiest to set up and operate. We add fluid by a drip method through a t-tube inserted in the irrigating tube near the chest. The irrigation flask can be emptied periodically by means of a syphon.

BATH PRURITUS: ITS CAUSE AND CURE*

By TOULMIN GAINES, M.D.,
Mobile, Ala.

Bath pruritis is a subject that has received scant notice in the text-books. Many of them do not even mention this condition, others dismiss it with a line, while few suggest any remedial measures, and none gives much encouragement as to relief.

It is a condition so temporary that it hardly deserves to be denominated a disease. It has a hypothetical pathology so transitory that it necessarily must be interpreted theoretically. It is often devoid of any visible lesions, and generally occurs under circumstances which preclude the presence of a physician.

Such a condition, our conversance with which is dependent upon the patient's description of his subjective symptoms, might appear to be of little interest to a group who pride themselves on their ocular proficiency in diagnosis, and who are prone to relegate therapeusis to a subordinate position in their deliberations.

A patient telling his story of intense suffering following a bath, especially a cold one, and supplementing it as he often does with a description of his discomfort upon undressing, or upon suddenly cooling after exercise, at the same time presents a skin apparently normal or with lesions merely the result of rubbing or scratching.

Such a patient is generally classed as neurotic, assured that he imagines his condition, advised to bathe oftener, told to try not to think about itching, or else he is given some bland ointment which proves ineffective. I shall endeavor in this paper to demonstrate that while there may be a psychogenic factor developed which intensifies the condition, that the disorder has a neurogenic basis; and that when, by observing a few simple directions, this neurogenic disturbance is eliminated, the psychogenic accompaniment will disappear.

Having had a case of bath pruritus under my immediate observation for fifteen years until a cure was finally found and easily effected; and having since invariably relieved those who have consulted me by merely giving them detailed advice about the manner of bathing until they are permanently relieved, I consider it to be incumbent upon me to record my experience in

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the therapeusis of this condition and to give my deductions therefrom for what profit it may prove in elucidating the cause of itching and effecting its control in allied conditions.

History of Case.—The disorder began at about the age of puberty, following either a hot or cold bath, and was more severe after the latter. Itching was more intense about the legs, arms and chest. The face, hands and feet did not itch. The stinging sensation was momentarily relieved by rubbing, with almost instant intensification of the discomfort. After about a half hour of real suffering, during which the patient sometimes became very much excited, there would suddenly pass over the surface a slight chilly and rather pleasurable sensation, the patient would break out in a sweat, and absolute relief would be immediate. He eventually learned that quickly getting into his clothes and running about the room shortened the interval to this sensation, sweating and relief. This was in part brought to his attention by his experience in creek bathing. Here his contortions as he endeavored to clothe himself were a source of much amusement to his companions but of torture to himself. A few steps along the sunny road on his way home found him free of all discomfort. Bathing in the comparatively warm water of the bay was followed by the same discomfort intensified also as in the other instances, if the patient was hot and perspiring at the time of bathing.

On several occasions following a swim in the bay he noted that upon dressing in a closed hot bath house he experienced no uncomfortable sensations.

The patient was also subject to paroxysms of itching if, after exercise, he cooled quickly in a draft, especially if he removed some or all of his clothes.

These details bring out the fact that the discomfort accompanies the checking of the perspiration and disappears as soon as the activity of the sweat gland is re-established; also that this effect on the sweat glands is due to lowering the temperature of the surface by cold water, or as a result of rapid evaporation of warm water or of perspiration. With this idea in view, I addressed my measures to keeping the skin acting by having the patient submerge in very hot water; remain until perspiration was well established; emerge and dry quickly in a warm room free of draught; avoid friction with towel and don his clothes while his skin was still moist. At first I allowed an alcoholic drink to promote perspiration and obtund the sensation in the peripheral nerve terminations. Later this was changed to hot coffee or tea, and later to a cold drink of lemonade or water. As the patient continued to escape his dreaded paroxysms not only was the emotional factor eliminated, but the irritability of his skin from repeated rubbing was allayed. He learned also a method by which a cold bath no longer held any terrors for him and soon found that cooling after exercise caused no itching nor was the nightly disrobing any longer to be dreaded for its consequent hours of discomfort.

For the hot bath the water should be as near 108° F. as the patient can bear; but a thermometer is not necessary. A better plan is to make the water as hot as can be borne by the hand, then submerge the foot until the heat is uncomfortable. Remove it for a few moments and resubmerge. If the water is still uncomfortable reduce the temperature somewhat. Fill the tub sufficiently to allow complete submergence of the body, stopping the overflow drain with putty if necessary. The patient should not take off all his clothes until he is ready to get in the tub. He should stand in the tub and wash from the waist down to the surface of the water; sit down and wash his feet. Then, after washing from waist to neck, he should immediately submerge and remain under the water for about fifteen minutes. The upper part of the body should be dried without friction while he is sitting in the water. Standing in the water, he should dry his limbs, drying his feet as he steps from the tub. The water should remain in the tub to help keep the room and the patient warm as he rapidly puts on his clothes. In taking a cold bath the same plan should be followed, as it is even more necessary to submerge as soon as possible and to remain under the water until the surface is so thoroughly chilled that the reaction is delayed until he can get into his clothes, exercise, and take a small warm drink or a copious cool draught to promote perspiration. A tepid bath is to be avoided, as it neither warms the patient sufficiently to cause perspiration nor cools him enough to retard the reaction.

Cause.—Although I have laid stress on the action of the sweat glands, it is merely because their activity is a clinical phenomenon that can be observed. I have long since concluded that the suppression of the sweat is concomitant, not a cause of the condition; while the renewal of the function accompanies and only partially aids a return to normal conditions. The evaporation of the sweat, however, is an important factor in causing lowering of the surface temperature and, in conjunction with changes in the temperature of the air and of water, brings about circulatory disturbances of a temporary nature which cause the sensation of itching. The sensation of itching necessarily means the involvement of sensory nerves. This involvement, I first thought to be the result of contraction of the arterioles; but a condition so sensative as to respond to variations of temperature from evaporation must include the circulation in the capillaries as well as the arterioles. A sensation of itching which occurs not when the skin is chilled, but just before the succeeding warmth of the reaction, must be due not alone to contraction of the vessels, but to some added factor accompanying the reaction.

I shall try to show that these *a priori* surmises are supported by facts from which can be deduced a tenable theory of the cause of this condition, with implications as to the pathology and treatment of other forms of pruritus.

"Blood vessels of the skin are under the influence of vasomotor mechanism; in cold weather constricted, in warm weather dilated. While the cutaneous vessels are constricted, the vessels of the abdominal viscera are dilated; while during dilation of the cutaneous vessels those of the viscera are constricted. The vast region innervated by the splanchnic is very easily constricted by stimulation of all possible kinds of sensory nerves. It may also be dilated by sensory excitation. The vasomotor nerves are stimulated reflexly . . . vasomotor reflexes can be discharged by the vessels themselves . . . also these reflexes are set up by all other possible kinds of afferent nerves. The reflex takes place primarily in the same vascular region whence came the afferent impulse. The effect of rubbing or warming the skin and the congestion of the intestines upon opening the abdominal cavity are instances of this reflex. The vasoconstrictors originate from anterior roots of the spinal cord and merge with the sympathetic before distribution. The vasodilators originate from posterior roots of the cord and accompany the distribution of the sensory nerves. The vasoconstrictor effect of stimulation often, if not always, predominates.

A strong vasodilation appears as an after effect of stimulation of both kinds of nerves. The two must affect the vessel at different points."[1]

"Vasodilation is not a merely passive condition caused by loss of tonicity of the vessel walls from relaxation of the constrictor muscles. It is a result of impulses from the vasodilator nerves acting upon longitudinal fibers of larger vessels and upon the neuromusculature of the capillaries. Relative activity of the constrictor and of the dilator fibers can be differentiated by alterations of temperature."[2]

"Vasodilator nerves have a more varied origin than vasoconstrictor and run an entirely different course.[3]

"These vasodilator nerves deserve our especial consideration. They belong to that unique class known as antidromic nerves or nerves that function against the current, as they are both motor and sensory nerves. The theory has been advanced that they are a survival of a primitive condition of the organism prior to the evolvement of the special senses from the ectoderm. According to Bayliss, these fibers cause vasodilation of the skin, have cell stations in the posterior roots, and are capable of conveying sensory impulses as well as motor function from the cord to the vessels."[4]

McLeod says: "It is of importance to note that at their terminations near the skin many sensory fibers split into several branches, some of which run to blood vessels and others to receptor organs."[3]

Stimulation of latter branches may cause dilatation of the local vessels near by, indicating that impulses must be transmitted up to the point where branching occurs and then down the vascular branch.

Krogh says dilation is due to local axon reflexes of the antidromic type along the fibers of sensory nerves which are supposed to (since verified) give off numerous branches to capillaries and small arteries.[5]

He also states that the lumina of the small arterioles is about the same as that of the capillaries and demonstrates that the capillaries may contract independently of the blood vessels.[6]

Dale and Richards say that the current conception of peripheral resistance to blood flow, as determined exclusively by the tone of the arteries, allows too little importance to capillary tone as a factor.[7]

Dale and Laidlaw, in their work on histamine shock, showed the independence of the capillaries from the rest of the vascular system.[8]

The condition which they demonstrated from the action of histamine was a dilation of the capillaries with contraction of the arterioles; a condition which, according to this thesis, is just reversed in bath pruritus, namely: a contraction of the capillaries with dilatation of the arteries.

As a result of lowering of surface temperature by cold water we have constriction of the vessels of the skin with an excess of blood driven to the internal organs, causing dilatation of the vessels of the splanchnic system. This dilatation is followed by a reflex contraction which drives the blood back to the surface.

We have noted the difference in origin, course and final distribution of the constrictor and of the dilator nerves; also that the vasoconstrictor effect of stimulation predominates. Now, should this vasoconstrictor effect not only predominate but persist, what would be the result when the oncoming tide of blood impelled by a *vis a tergo* from the vast region innervated by the splanchnic reaches the surface of the skin? Along the course of the larger vessels the way is made clear by the local reflexes in the vessels themselves which accommodate their caliber to the contained circulation, but what may happen in the constricted capillaries of the skin where dilatation depends upon a special set of nerves differing in origin from the constrictors and in no way under the control of the nerve force which is driving the current through their constricted lumina? When we consider that these nerve filaments which are failing to perform their motor function of dilatation are also capable of carrying sensory impulses is it not reasonable to assume that the intravascular tension caused by this temporary damming of the circulation is the cause of the painful stinging sensations of bath pruritus? The antidromic nerves are mentioned by Bayliss as probably being implicated in the pain of herpes and of erythema.

In the former, the tension is extra-vascular, in the latter intra-vascular.

Eller[9] quotes Lewis[10] as suggesting that skin lesions may be produced antidromically by irritation of sensory nerves and release of a (hypothetical) vasodilator substance. He also mentions a distinction between a sensory neurosis and a vasomotor sensory neurosis (of Nothnagel).

The role of intravascular tension in thus causing itching is also shown in the marked difference in the subjective symptoms attending a papular rash of erythema or inflammation and one due to cellular infiltration or degenerative changes.

Another evidence is in the relief afforded by denudation of the surface allowing the flow of serum or blood, thus relieving local tension. Recalling the intense discomfort of bath pruritus, one would be inclined to disregard the theory of Dr. Bronson's classic paper, that itching is a modification of the aphrodisiac sensation, as in this instance the pleasurable sensation is entirely absent. However, our theory brings out this analogy: that a flow of blood to the part is a factor in the modification of sensation.[11]

The immediate effect of hot water on the skin is a temporary contraction followed by a dilatation. I have wondered whether the slight chilly sensation momentarily caused by hot water were in some way related to the similar sensation felt just prior to the patient's getting relief with the outbreak of sweat.

Understanding now the neurogenic mechanism which produces this condition, we can see how under the continued influence of warmth the surface vessels remain dilated and no itching results.

When cold is applied there occurs local spasmodic contraction of the capillaries which can be relieved best by increasing the body temperature; putting on the clothes to prevent evaporation and to conserve heat radiation; by a warm drink to increase body warmth; muscular exercise to elevate temperature and to relieve tension by dilating muscular capillaries, or copious ingestion of fluids to start the action of the sweat glands and further relieve the vascular tension in the small vessels.

As to the primary etiology, we might have recourse to that vague condition known as sympathecotonia, which is defined as a stimulated condition of the vegetative autonomic system, characterized by vascular spasm and heightened blood pressure, in this instance both of these conditions being temporary.

According to the well known principle of nervous impulses following the track of previous impulses, repeated attacks cause a habit of the involved contractile elements, just as a cramping muscle is subject to recurrences, as in intermittent claudication. This causes the patient to be more and more sensitive to temperature alterations, with resulting prickling. In his ignorance as to the cause of the trouble, he often uses irritating soaps or other applications or by too vigorous scrubbing or rubbing of the skin sets up a superimposed condition which adds to the local irritation and excites further emotional disturbance such as described by Brocq,[12] which feeds the flame even though this be "a straw fire" which suddenly subsides.

With the removal of the cause, the patient's apprehension is quieted, the adventitious lesions and conditions due to manipulation disappear and with lack of repetition of this complex, the tendency to this abnormal reaction subsides and the patient is entirely cured or only subject to occasional slight prickling, easily dissipated by a knowledge of its causation.

A study of the three cases in the "Queries" of the *Journal of the American Medical Association* Oct. 19, 1929, will show many points of accord with the case I have detailed, while the divergence as to treatment will, I trust, make this paper of some practical value not only in bath pruritus but in such circulatory conditions as pruritus hiemalis and pruritus senilis, as well as make us more meticulous in our instructions as to bathing in other pruritic conditions.

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DISCUSSION (*Abstract*)

Dr. Elmo D. French, Miami, Fla.—Dr. Gaines does not go into the hypothetical questions of physical allergy popular with internists, who used to speak of "auto-intoxication" or "too much acid" in connection with the condition.

If I had to treat one of these cases, there are two drugs that I would have in mind: one is pilocarpin to produce the very sweating reaction which Dr. Gaines says checks the pruritus; the other is calcium gluconate; and the other method of treatment that I should be tempted to use would be the Alpine light.

Dr. Gaines (closing).—Since this paper was written I have been consulted by three patients at home and two physicians in Miami, one a visitor and one a resident. A large proportion of my patients have been physicians. I think the condition is more prevalent than we imagine. I believe many persons who have it hesitate to consult a physician for fear of ridicule. Its existence is sometimes brought out while examining a patient for other conditions. Pilocarpine may be indicated, but I have never found it necessary.

I was recently consulted by a young man who complained of suffering intensely with a feeling as if hot needles were sticking in his legs. The area involved was that exposed to the air above his socks and below the edge of the trousers when he was in a sitting position. He had been a sufferer from bath pruritus for years. The use of side garters entirely eliminated the local discomfort. He had been told by many physicians that it was imagination, but it was the effect of the air cooling a sensitive skin.

DIAGNOSIS AND TREATMENT OF GASTRO-INTESTINAL DISEASES*

By J. C. JOHNSON, M.D.,
Atlanta, Ga.

This paper was suggested by a recent review of 2,000 consecutive cases under our care. The purpose of the review was to collect facts, note errors, and especially to learn, if possible, the causes of failure in treatment where success was reasonably expected.

Failure in treatment is usually ascribed to mistakes in diagnosis. We have to admit the failures, but I believe that the number of mistakes charged to the profession as a whole has been exaggerated. I do not believe that failure in treatment is due so often to incorrectness of diagnosis as it is to incompleteness, and to unwillingness or inability of patients to do as long as necessary what is necessary to get well. Nevertheless, there are mistakes in diagnosis and failures in treatment which are deplorable, and avoidable, and I believe a remedy can be found for both in due consideration of fundamentals. Differences in conception of diagnosis and differences in diagnosis are the result of differences in conception of disease. Conception of disease depends upon one's ideas of pathology. In one case, diagnosis may mean nothing more than finding something wrong and giving it a name; in another, deciding what is wrong by the name of what is found. In either case, fundamentals are left to be accounted for.

Unfortunately, there are many popular theories which intrude upon examinations, and, when allowed, give direction to all inquiry, magnifying or minimizing what we see or learn, making it difficult to approach diagnosis with an open mind. The most conspicuous of these is that relating to the primary or secondary nature of gastro-intestinal diseases, important only because it diverts consideration from something more important, namely: how these diseases come about and what relation one process bears to another.

No examination is complete and no perfect diagnosis is possible which does not explain every symptom present. This means that gastro-enterology as a practice is more comprehensive than gastro-enterology as a science, and that surgery and general medicine are not comprehensive enough if they omit consideration of digestive functions in any disease. Syphilis, tuberculosis and other diseases have a positive influence on digestive misbehavior, but that does not prove a primary causative relationship, or that this misbehavior is less important as a fact or as a symptom in the ensemble of the disease. Achlohydria and diarrhea in one case of tuberculosis certainly needs different treatment from that which is needed for hyperchlorhydria and constipation in another case of tuberculosis. Since Dr. Mayo, many years ago, announced that there were no primary diseases of the stomach but ulcer and cancer, all doors, except those of gastro-enterology, have been closed to argument against it. It is a waste of time to take either side of the controversy. There are no primary diseases of any sort in the body, although certain conditions may be first in appearance or in order of development.

Ulcer is a cellular necrosis, not even secondary as a process, and hence cannot be the primary source of anything. Cancer, whatever else it may be, is an abortion of normal cell evolution, and to declare a hereditary relationship between it and ulcer we must not only reject a fundamental principle in gastro-enterology, but revise our conception of fundamental medicine.

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So with all the so-called surgical diseases of the alimentary tract. Appendicitis, however acute and apparently independent, is only a step in a succession of morbid processes, the first of which may long antedate the attack, and the last of which may follow long after the appendix has been removed. By no other fact can we explain the many operative failures of relief of symptoms attributable to the appendix alone.

The magnification of gross pathology threatens to overshadow the more intimate phases of disease, and mechanical and synthetic substitutes do not contribute to originality in diagnosis and treatment. The talents of the manufacturer, chemist and pharmacist are indispensable to medicine now, but not more so than the appreciation and use of knowledge which we already have, and of means which that knowledge has provided. After all diagnosis is interpretation. Dr. Mayo was securely right when he said, "Physico-chemistry is the master word in medicine today," and that means physico-chemistry in every organ and function of the body and its translation into terms of diagnosis and treatment of disease.

There are some of the profession who, in the glare of their own genius, either do not recognize this simple fact or see no need for its common use in gastro-enterology. They are now saying that nothing is learned by gastric analysis. This is a challenge to the illustrious work of many distinguished men and to some of the brightest pages in the history of medicine. It can be answered in a very few words. The work of no organ can be taken for granted, nor the knowledge of that work be qualified without visual, palpable, analytical proof of it.

I am as much dependent on the test meal as I ever was. By it I learn something of the temperament of the patient, his willingness and capacity to do, the presence or absence of spasm or constriction, the position, tone and sensibility of the stomach, the insufficiency or excess of content, and, by analysis, the relative proportions of contents of the gastric juice, the presence of anything abnormal, the absence of what should be present, and other things not in evidence or to be reasonably presumed.

It appears in text-books and in current writings that bile is an aid to gastric digestion, that it gets in the stomach by regurgitation. It is not explained how it gets in while chyme is going out; or why the stomach needs it except to neutralize excess of acid. Regurgitation is not a normal process of the body, and I know of no provision made to accomplish it for the benefit of the stomach. To admit its necessity is to recognize its occurrence as pathological, and to explain it as a measure of conservation is to deny the consistency of fundamental law.

Bile in the stomach means one or any number of the following conditions: dynamic inequality between stomach and duodenum, faulty response of duodenum to the stimulus of chyme, misdirection of duodenal impulses, disturbance of reciprocal relationship, gastric hypotension and hypoperistalsis, duodenal hypertension, duodenitis or blockage, and last, but not least, a poor invitation and a bad beginning for the passage of food down the intestinal canal.

I am told by some patients that they have been told by some surgeons that they will never be well until the appendix is taken out. These and other snap opinions have been grafted on the body of medicine, encouraged and multiplied until medicine appears to the public like a medley of fancies instead of an assemblage of coordinated facts. They illustrate how easy it is to set aside, as negligible or natural, something usual or of frequent occurrence, and to explain what is doubtful and difficult in the most convenient way. We all have clinical experiences and basic resources which should enable us to avoid the consequences of such immaturity or impulsiveness.

In the report of the survey of the 2,000 cases I find the following:

"Two thousand successive cases, regardless of complaint or diagnosis, showed an operated total of 878, or 44 per cent. These figures included all major operations done for health, and excluded those done for other purposes or caused by accidents. Four hundred and ninety-seven of these patients had had laparotomies, 24.5 per cent.

"Another survey was made on the same series of cases, eliminating those patients who had no symptoms, primary or secondary, related to the digestive tract. This group included every case having heartburn, fullness, belching, alteration of appetite, abdominal and lower chest pain, backache, gas, constipation, diarrhea, abnormal stools, sick headache, and all others that the patient's belief or the examination connected with the digestive organs. This series numbered 1,524 cases, 728 of which had been operated upon, 478, or 31.5 per cent, having had laparotomies. The total number of laparotomies done on these was 549, or 71 "extras." The average age of these patients was forty-one and one-half years, the average duration of present symptoms seven years; the shortest two weeks; the longest fifty-five years, cases at once recognized as surgical and sent to operation not included. The average number of separate symptoms, ten and one-half; average factors in past history needing consideration, exclusive of psychic and domestic, three and one-half; average presence of distinct pathological conditions not necessarily

related, six; average possible separate diagnosis in each case, three and one-half; average total factors in diagnosis of each case, twenty; total number of distinct symptoms, counting all cases, fifty. The most common conditions or diseases found mentioned in order of frequency were: colitis, hyperchlorhydria, ptosis, ulcer, gall-bladder, tuberculosis, achylia, syphilis, cancer, infestation, malaria, pellagra, pernicious anemia."

A case in which tuberculosis was most prominent will illustrate the point I am trying to make just here. This patient had a total of ten symptoms: four factors in his past history worthy of consideration, and eight not necessarily related pathological conditions were found. Besides that of tuberculosis, a diagnosis of four different and usually distinct diseases was required to indicate the full extent and complex nature of this patient's trouble. It was easy to call each of these different diseases or conditions by its familiar name, but what about the patient? A diagnosis of tuberculosis alone would fall far short of comprehending or defining his trouble, and no treatment directed to that or to any other disease alone would meet his every need. What shall we say about these cases in the clinic, in the class room, in current medicine, in consultations, to the patients themselves, and how shall we catalogue them, or give them suitable names?

Here we have two thousand people, of all ages and stations in life, such as are being seen daily by physicians everywhere, and are familiar to every gastro-enterologist. They have histories close akin and many symptoms in common, but no two are alike; they are not capable of classification, and do not allow generalization in diagnosis and treatment. Not one of them could be taken blindly or confidently as a guide, and in none of them is there a symptom which would presuppose association or occurrence of another. Each is a problem within itself, like one in arithmetic, which cannot be worked out by any special figure, but only by all figures placed in right relationship according to a fundamental rule. When we find the Klebs-Loeffler bacillus we know the patient has diphtheria; plasmodium, malaria, and so with all other diseases which have a known cause, a definite pathology and a predetermined course. It is not so with these patients. The cause, the pathology, and the course are all concealed behind the relationship of symptoms.

Subjective symptoms are the records of distorted sensibilities, not materially apparent, and possible without addition or loss of any property of the body. Yet, upon them chiefly, or entirely, must we sometimes depend for diagnosis and treatment. Dizziness is dizziness, whether from trouble with eyes, ears, head, abdomen, or blood, and the fundamental factors are the same, but they point to something different in each case.

Nausea in pregnancy, toxicity, Bright's disease, colitis, gastritis, in any disease whatsoever, though having different origins, must come in the same way in order to reach the same conclusion. It may accompany pain as the only cause, not as an essential product of the pathology, but as reciprocal perversion, for the relief of pain comparative, but not complete, as a symptom.

Pain, usually due to a local cause, may mean much or little. Its value in diagnosis depends on correct description and location, and upon knowledge of the fact that it varies in character, frequency and severity according to the tissue involved, the abnormal changes taking place or completed in that tissue and in the function, being performed, attempted or interrupted. To Dr. Trimble Johnson credit is due for emphasis of this fact in our differential diagnosis in acute abdominal pain. He believes, and it has been demonstrated by operations, that when belladonna or one of its derivatives, short of lethal doses, does not relieve the pain within a reasonable time, the pain is due to structural and not to functional impairment.

Imaginary pain is an exaggerated consiousness of normal sensibility, subjective in origin. The knowledge by the patient of a subjective symptom often becomes the means of precipitating or intensifying it, not by adding factors or changing them, but by the unnatural effort to estimate and control an involuntary by a voluntary function, a fact of great importance in evaluating symptoms and in treatment. There is no way to prove or measure a subjective symptom except by presence of other symptoms, already existing or produced by pressure, position, exercise or provocative medication. Exaggeration of sensibility may be the first token of conservation, as the reference of sensation may be the proof of vicarious or reflex action: for example, pseudo-angina in gall-bladder disease, or pain in the shoulder from gastric, duodenal or other disease.

I have found most perplexing of all pains the more or less vague, constant, nagging ones in the left upper quadrant, suggestive of gastric distension or inflammation, diaphragmatic hernia, splenic colitis, calculi, coloptosis, and the backaches, leg aches, headaches, none of which,

seemingly, are influenced by acts of digestion or by voluntary movement, the causes of which challenge the most thorough physical, chemical and x-ray examination and deduction. In attempting to interpret symptoms and differentiate their causative factors, I know of nothing more helpful or reliable than a test furnished by the interests and activities of daily life; the effect of food and drink; the amount, kind and effect of sleep; the balance of secretions and excretions. Natural results can only follow natural causes, and the nearer we approach or supplement these processes in diagnosis and treatment the more rational our conclusion, and the more certain we feel of success.

No subjective symptom can really be detached from its associates, for no function is independent. Yet only by a separate analysis can any of them be explained and their value in diagnosis be determined. This separation is made virtually possible by considering each as an entity in chemico-physical and functional activity. It is very natural to suspect appendicitis with pain in the right ileac region; gallbladder disease with pain in the right hypochondrium; ulcer with pain after meals or during the night; because pain thus occurring often means the presence of these respective troubles; but without other knowledge than that furnished by the cases cited in the table, we are obliged to think that many diagnoses made upon pain or other obscure symptoms alone have been incorrect or incomplete.

The fact that today we may find the cecum low in the pelvis and apparently fixed, the colon limp and sagging beside it, and a few weeks later find them both in normal place and movable, and that today what looks like gastric cancer may three days hence prove gastrospasm, means that the most thorough examination may not always discover everything needed for perfect diagnosis, and that re-examinations are nearly always necessary, that the position, movement, tone, sensibility and functions of the gastro-intestinal tract vary within certain normal limits, and that when this limit is not reached or is exceeded there is disease.

Those of you who, like myself, consider the position of the stomach and intestines of some importance, see in ptosis a definite but imperfect picture of disease, requiring a background such as is naturally supplied by their anatomical and physiological relationship. I cannot conceive of any radical change in the position, tone, movement or function of any part of the alimentary tract without resultant change in it all, not visible or measurable perhaps, but recognizable by the patient in consciousness of function, by discomfort, and a sense of disability. A consideration of the mechanics of the alimentary tract in comparison with inorganic units scientifically arranged for a definite purpose will find these essential differences. The alimentary canal has an initiative, reparative and reproductive capacity which the inorganic units have not. This alimentary capacity allows for adaptability and conservation, but not for change in relationship or function. The laws of physics are as inflexible in organic as in inorganic reactions. There is nothing about the duodenum which can be normal with the stomach dragging on it. There is nothing about the small intestine which can be normal with the colon failing or falling behind in its duty, and the colon cannot work efficiently when its attachments have been strained; its direction has been changed, and its movements are hindered by intrusion of one part upon another. More than this, in visceroptosis, the tributaries of the portal system cannot escape participation, nor can the liver, the blood, nutrition, nor the balance of the vital economy.

Ptosis has a pathological condition behind it, in it, and before it. Elasticity means also contractility and loss of one means the loss of the other. The skeletal muscles have two point fixation for their support and movement. The involuntary have nothing but continuity and an accommodating relationship. A colony of cells must hold while others work, and by succession develop peristalsis and rhythmic segmentation. Not only this: the digestive organs all must serve and wait for their portion of the benefits which they make possible. It is easy, then, to see and understand how by overwork, by injury, by opposition, the divisions of the alimentary canal can undergo decompensation and suffer constant shock like the heart when overtaxed, unprotected, or unrepaired from any cause.

Perfect functioning relates to time and order of accomplishment, as well as the work that is done and the energy expended. This applies to the secretory as well as to the motor functions of the digestive tract. After all it is not the amount, relative proportion, effect on food, or on other secretions about which we need to be most concerned, but the act of secretion itself. It is not the things accomplished but the exercise of an organ in accomplishing it that preserves its integrity. The hand maintains its strength and cunning not by what it makes or

moves, but by daily consistent use of its capacity. For this reason, food apart from its vitamins and calories and other constituents, becomes of more than usual importance in the treatment of gastro-intestinal disease. For the same reason permanent cures are more difficult. A glass of water stimulates because it awakens to action gastric forces which should be engaged. Food relieves nausea, and sometimes pain, not because it neutralizes content or supplies an immediate need of the stomach or the body, but because it diverts stimuli, enlarges molecular surface, restores normal tension, and calls upon allied organs for reciprocal activity. And so with all drugs and treatment whose chemical and physical properties supplement and coordinate fundamental forces and functions of the body.

Achylia is an anomaly which cannot be explained by lack of food or its effect, because the gastric secretion is independent of alien contact or reaction. It is not a material fault nor a physiological inhibition, but a negative of the dynamic relationship of the gastric cells with the blood or balance of the body. This is often seen in tuberculosis, pellagra, pernicious anemia and the later stages of cancer. Meanwhile digestion suffers not alone from the absence of acid, but from the organic deficiency behind this absence. On the other hand, hyperchlorhydria is not only an evidence of dynamic exaltation, but by its activating power becomes a task master to the duodenum, the gall-bladder and other allies in digestion, easily and often, resulting in duodenal hypertension, hyperperistalsis, impairment or loss of reciprocal relationship, defensive or offensive structural changes.

I realize that this paper is hardly an introduction to our subject. It has no purpose nor pretense beyond that. This is a day of mergers and great movements, but science cannot be taken as a whole, nor public health, nor disease. It seems to me the time has come when every field of medicine should magnify its work by simplifying it, in precept and in practice, by a larger consideration of fundamentals.

Dr. Reese, Chairman of the Section of Pathology and Physiology, at the last meeting of the American Medical Association, put the whole matter tersely when he said: "Physiology is not a stepping-stone to clinical medicine. It is clinical medicine."

SUMMARY

Disease is not an event nor a condition, but a succession of physiological perversions which establish a relationship between one or more morbid agencies and the ultimate effect.

Localization of disease is concurrent with the inhibition or interruption of functional activity.

Localization of symptoms indicates the absence or impairment of reciprocal relationship.

Diseases may co-exist, but co-existence does not prove a common cause, nor that the symptoms of one of the diseases are less important than those of the other. Association of symptoms suggests but does not presuppose intimate relationship.

Subjective symptoms indicate more what is happening than what has happened, therefore are more intimately related to causes and processes than to results.

Objective symptoms indicate more what has happened than what is happening, therefore are more intimately related to results than to processes and causes.

Diagnosis is more than the recognition and naming of one or more diseases in a patient. It is not complete without a definite knowledge of every organ's function and relationship throughout the body, and not until every symptom is fundamentally explained.

The large percentage of postoperative gastro-intestinal diseases proves either that the preoperative diagnosis was incorrect or incomplete; that the operations failed to remove the primary cause, or that they produced a pathological condition which did not previously exist.

DISCUSSION *(Abstract)*

Dr. Ernest H. Gaither, Baltimore, Md.—I thoroughly agree with Dr. Johnson as to the importance of thorough investigation in gastro-intestinal conditions, also with the idea which he brings out very clearly, that just because there is more than one pathological condition one should not be independent of another.

The other points which Dr. Johnson discusses I concur in, and I think the paper is extremely timely in calling our attention to the importance of diagnosis, and in showing that if the patient has ulcer of the stomach or duodenum there is no reason why he should not also have other pathological conditions.

Dr. John B. Fitts, Atlanta, Ga.—It has been some twelve years since the formation of this Section, and it is fitting that a survey of the fundamentals in gastro-enterology be presented, particularly by the first Chairman of the Section.

The essayist has emphasized the difficulties in diagnosis of gastro-intestinal conditions. Proper interpretation is obviously dependent on proper conception; in gastro-intestinal disease rational evaluation is necessary in differentiating functional and structural changes.

I am in entire agreement with Dr. Johnson as to the usefulness of the test meal, both in the general diag-

nostic survey and in the more detailed gastro-intestinal study. No one can correctly anticipate the status of gastric motility and secretion without it.

It seems to me that the surgical aspects of gastro-enterology are becoming more clearly defined and that the trend is toward closer cooperation between surgeon and internist, both seeking to work out that policy which will give the best result to the patient, whether it be medical or surgical or a utilization of both.

In this paper the conditions found in the series of patients studied were in their order of predominance colitis, hyperchlorhydria, ptosis, ulcer, gall-bladder, and so forth. In the first of this group under the heading of colitis, I am sure the essayist means to include the entire group of colon abnormalities, such as the colon stases, the spastic and irritable colon types and the various colitides, all going to make up that large group of the so-called "chronic intestinal invalids." We are appreciating more and more the important role that colon disease indirectly plays in gastric function.

In gastro-intestinal diagnosis it is essential to understand the interrelationship of the alimentary with other bodily systems, the former being the barometer often of abnormal states elsewhere. Of particular importance are the environmental factors, such as fatigue states, emotional strains, faulty food and dietetic factors, and inadequate eliminative conditions.

It is of interest to keep in mind the manifestations of the sympathetic and vagus nerve systems on the gastro-intestinal tract; for example, a tuberculous or thyroid toxemia acting through the sympathetic nervous system producing gastro-intestinal symptoms. And all clinical medicine, as the essayist concludes, is an appreciation of abnormal physiology.

ETIOLOGICAL TYPES OF HEART DISEASE IN PROFESSIONAL MEN WITH SPECIAL REFERENCE TO PHYSICIANS*

By EMMET F. HORINE, M.D.,†
and
MORRIS M. WEISS, M.D.,‡
Louisville, Ky.

This investigation of heart disease as encountered in members of the learned professions was undertaken for the purpose of determining the frequency of etiological types. In a search of the literature we have been unable to locate a similar study. Hyman[1] studied 100 physicians who presented themselves for cardiovascular examination. However, he does not classify them from an etiological point of view. In our study no attempt has been made to discuss the frequency of heart disease in the professions as compared to that in the lay population.

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†Assistant Clinical Professor of Medicine, School of Medicine, University of Louisville.

‡Clinical Assistant in Medicine, School of Medicine, University of Louisville.

The basis for this special study is a selected group of 163 professional individuals. No patients were included without a complete study and, in most instances, they have been followed either for an average period of five years or until death. There were 99 physicians, 26 clergymen, 20 attorneys and 18 dentists. Percentage figures have been omitted for the reason that in such a small group calculations of this nature could only be misleading. The accompanying table shows the etiological types of heart disease encountered.

In the above tabulation of heart conditions none has been found of unknown etiology, although it is admitted that in our practice we encounter an occasional case in which the causation is either doubtful or not discoverable. In the clinics in which the criteria for diagnosis of the American Heart Association are rigidly followed, the percentage incidence of unidentified heart cases is placed at ten or above, an average which, to us, appears extremely high. According to the American Heart Association criteria:[2]

"The etiology should be stated as unknown in those cases which present either definite structural changes in the heart or evidence of abnormal cardiac function for which no definite etiology can be determined."

Thus a patient with mitral stenosis is placed in the unidentified group provided there is no previous history of a definite rheumatic type of disease. Yet the subjective symptoms of rheumatic lesions are occasionally so mild and evanescent as not to attract the attention of the individual. For example, the mild joint discomfort, the so-called "growing pains," encountered in children often go unnoticed, although such pain may constitute the only subjective symptom of an active rheumatic endocarditis. We believe that the discovery of a mitral stenosis in a young person leads to an etiological diagnosis of rheumatic heart disease regardless of the previous history. Of course, in an elderly person, sclerotic changes in the mitral valve may produce a stenosis.

We have seen patients placed also in the unidentified group who had marked cardiac hypertrophy, with a normal or reduced blood pressure level or with evidence of heart failure, but without any valvular lesion present or other factor that might produce the cardiac enlargement. We believe that such patients must of necessity fall in the hypertensive group even though the previous level of the blood pressure is unknown. Ophthalmoscopic signs of a pre-existing hypertension frequently will be found. Roentgenologic examination may furnish suggestive proof of the presence of a previous hypertension because of

TABLE

Profession	Age Range	Rheumatic Heart Disease	Syphilitic Heart Disease	Hypertension Alone and with Coronary Sclerosis	Arteriosclerotic Heart Disease	Angina Pectoris	Emphysema Heart	Thyroid Heart		Functional Heart Disturbances		Total
								Hyper.	Hypo.	Effort Syndrome	Premature Contractions	163
Physicians	27-86	3	3	32	19	0	1	3	10	16	12	99
Clergymen	37-75	0	0	15	2	2	0	0	6	1	0	26
Attorneys	29-77	1	1	10	3	1	0	0	2	1	1	20
Dentists	22-60	1	0	8	3	0	0	0	1	5	0	18

the cardiac silhouette. In addition, impairment of renal function or even uremia may be present. Electrocardiographically marked left axis deviation and frequently the coronary types of electrocardiograms are encountered here such as are often found in the known hypertensive individuals. While this type of electrocardiogram does not of itself evidence pre-existing hypertension, its presence with an unexplained cardiac enlargement, eye ground signs and findings of renal impairment, is suggestive proof of the previous elevated state of the blood pressure. In hypertensive cases the development of a coronary occlusion results in a marked lowering of the blood pressure to normal or even subnormal levels. Further, in twenty years of recorded blood pressure observations we have had the personal opportunity to watch certain patients who first presented merely hypertension, later gradually developed cardiac hypertrophy, still later presented electrocardiographic evidence of coronary changes and who, following an acute coronary occlusion or the onset of congestive heart failure, finally showed a marked lowering of the blood pressure. The arteriosclerotic or primary contracted kidney which always evidences a hypertension during the life of the individual will be found frequently at autopsy in such cases. For these reasons every individual has been placed in the hypertensive group who presented cardiac hypertrophy without any explanation for it, regardless of the blood pressure level.

Geoffrey Evans[3] concluded that cardiac hypertrophy without organic valvular lesion or chronic pulmonary disease found post mortem is good evidence of a raised blood pressure during life. Ophuels[4] called attention to the fact that pre-existing hypertension could explain the cardiac hypertrophy in such cases as were described above. He merely states in referring to a clinical study of similar cases by Christian[5] that:

"His patients must have suffered from continued hypertension at one time or another, because with the exception of valvular lesions, which were not present, this is the only condition which can reasonably explain the hypertrophy of the left side of the heart, which was said to have been present."

Cabot[6] in a pathological study includes in the classification of hypertensive cardiovascular disease:

"All necropsied cases showing a hypertrophied and dilated heart associated with nephritis, with arteriosclerosis, with both, or with neither, but without valvular disease, chronic pericarditis, and any other recognized cause of cardiac enlargement."

Bell and Clawson[7] state that a diagnosis of primary hypertension may be made clinically:

"In a person suffering from chronic cardiac disease, with low or normal pressure, if there is a demonstrable cardiac hypertrophy of the left ventricular type not associated with any disease known to cause hypertrophy."

It may be observed that no reference is made to the incidence of peripheral arteriosclerosis as evidencing arteriosclerotic heart disease. From the present and additional studies we are convinced that the mere presence of peripheral arteriosclerosis is no criterion as to the degree of aortic and coronary sclerosis present. While we make note on our records of the presence of peripheral arteriosclerosis we depend upon physical and roentgenological examinations of the heart, together with the evidence furnished by electrocardiographic studies, for a diagnosis of arteriosclerotic heart disease.

Physicians apparently present the arteriosclerotic type of heart disease more frequently than do members of the other professions, though dentists constitute a close second with attorneys third and clergymen fourth. With the hypertensive types the order of frequency is apparently exactly the reverse. Further considering

the two degenerative types together the order of frequency is as follows: attorneys, clergymen, dentists and, finally, physicians.

In this group of 163 cases only three instances of so-called angina pectoris are recorded: two clergymen and one attorney. Osler[8] and other authors have mentioned a high incidence of angina pectoris among physicians. Some explanation is necessary for the apparently low incidence of angina pectoris which we record among many individuals above the fortieth year of age. When many of our coronary sclerosis cases were first seen, merely complaining of anginal pain, we made a tentative diagnosis of angina pectoris. With electrocardiographic studies extending over a period of time, sufficient evidence was obtained to make us absolutely certain that the anginal attacks were the result of definite coronary changes. These patients had to be reclassified. In some instances an acute coronary occlusion clarified the diagnosis. It is possible that the three individuals with angina pectoris herewith reported may also eventually be classified in the coronary group. We do not mean to imply that angina pectoris in all instances has a coronary basis but, except for the three cases mentioned, every individual complaining of the anginal syndrome in this group of professional men had either hypertension or electrocardiographic evidence of coronary sclerosis when first seen, or else developed characteristic electrocardiographic changes or definite clinical evidence of such coronary disease at a later period.

A typical example of the necessity for such a change in diagnosis is given in the following case report:

> A clergyman, 70 years of age, was first seen in October, 1921. For the preceding four years he had been experiencing substernal pain, vise-like in character, which radiated into the left arm. At first the pain appeared only after considerable exertion, but recently slight exertion led to pain. The attacks were of short duration and disappeared with rest. Physical findings were negative. His blood pressure was 128/84 mm. Hg. with a ventricular rate of 88. Electrocardiograms were negative. At this time a diagnosis of angina pectoris was made. He felt more comfortable with enforced rest and nitrites. After eighteen months the frequency of the attacks increased materially; then he had a very typical attack of agonizing substernal pain lasting for over an hour. Subsequently he developed congestive heart failure and later died during an attack of acute coronary occlusion. The diagnosis was necessarily changed to arteriosclerotic heart disease with acute coronary occlusion.

It develops that angina pectoris in our experience is purely a symptomatic diagnosis. Persistent study over a sufficient period may be necessary before proper classification can be made.

It has been our experience that hypertensive individuals in the professions are not necessarily overweight, short of neck, soft of muscle or sluggish of body movement. They are not especially irritable, tense or restless. Nor can they all be placed in the category of the "tired business man."[9] A fair number are of the type described above, but there are so many exceptions encountered that such a description of the hypertensive is misleading.

We have not segregated our cases of acute coronary occlusion in a special group, but have considered them as a complication developing in the course of some etiological group. Aside from hypertension and arteriosclerosis we were unable to find any etiological factor in the causation of coronary thrombosis in this study. We have observed a few instances in which an infection, particularly influenza, seemed to be followed by an acute coronary occlusion. It has been stated that patients with coronary thrombosis were "muscular and strong and had done hard physical work either in their occupations or at play."[10] Our own observations in this group of professional men do not seem to bear this out. Ten physicians, four dentists, four attorneys and two clergymen had an acute coronary occlusion.

The frequency of rheumatic heart disease in our study is relatively low due undoubtedly to the older age groups studied.

Syphilitic heart disease was infrequently encountered. The higher moral standards among professional men probably partly explains the relative infrequency of syphilitic lesions. Further, were a syphilitic infection contracted, early and vigorous treatment would more probably be instituted.

Thyroid heart disease was a rather prominent group. Hyperthyroidism was encountered three times while hypothyroidism was frequently found, there being ten physicians, six clergymen, two attorneys and one dentist falling under this classification. We did not find a single instance of so-called "myxedema heart," but the patients in the hypothyroid group did complain of easy fatigue, moderate shortness of breath and, even at times, of palpitation. In several a diagnosis of "chronic myocarditis" had been made by some one in the past. Basal metabolic rate determinations have revealed the true basis for the complaints of these individuals, there being in all cases a moderate lowering of the basal metabolism. While none of the group had evidence

of frank myxedema and none had detectable signs of organic heart disease yet physico-chemical changes in the heart muscle cells the result of lowered thyroid function simulating that found in myxedema but of a minimal degree might have been responsible for the symptoms. When the basal metabolism became normal the symptoms disappeared and when the thyroid therapy was allowed to lapse the symptoms began to reappear. Because of the apparently definite etiology of the disease in these patients with lowered metabolism, we have included them in the thyroid group.

Individuals with heart symptoms but without detectable signs of organic heart disease for example, cases of effort syndrome, premature contractions and cardiac neurosis were considered in the classification of functional heart disease. The chief exception to this was the hypothyroid cases, but they were included in a special group as mentioned above. The three individuals with angina pectoris should probably be included in the functional classification, but since they represent a distinct clinical entity and also since, in our experience, all so-called frank cases of angina pectoris have ultimately been found to have an organic basis, we have segregated them in a special group.

Often physicians present a definite anxiety neurosis based upon the sole presence of an insignificant abnormality as for example, a systolic murmur or upon the presence of vague symptoms referable to the heart. The history of a typical case is here given:

Five years ago a physician 32 years of age presented himself for examination, stating that he had some pain and occasionally an aching sensation in the region of the heart and that he had known of the presence of a heart murmur which had been diagnosed during his student days as an organic lesion. He had guarded against any except light physical exercise, fearing that further damage to the heart might ensue.

Examination revealed a heart perfectly normal in size and contour. There were no precordial thrills and auscultation revealed only a blowing apical systolic murmur heard over an area 6 cm. in diameter. His electrocardiogram was normal. Aside from being underweight no other physical abnormality was discovered. When told that no real significance could be attached to such a murmur he seemed to improve immediately. He was advised to get more exercise and to take up golf. He cheerfully followed directions and within a year reported that he felt better than he had since his student days. He apparently enjoys perfect health at the present time.

Medical men seem to present premature contractions alone or combined with an anxiety neurosis more often than members of other professions. Hyman[1] also noted the high incidence of premature contractions among physicians. Effort syndrome is encountered rather frequently among professional men. As a rule, physicians are overworked and especially is it impossible for them to lead an orderly life. They eat as and when they can, they retire at no regular hour and are subject to frequent calls during the night so that it is little wonder that functional heart conditions may develop. Coupled with this fact they may frequently indulge in the use of tobacco too freely which, in susceptible individuals, may lead to tachycardia or to the initiation of premature beats. In passing we may say that, thus far, we have no evidence pointing to the production of an organic cardiac lesion through overindulgence in tobacco. However, we can state that certain existing lesions such as a coronary sclerosis with an anginal syndrome may be aggravated by the use of tobacco.

The prognosis and treatment of heart conditions encountered in these professional groups does not differ from that in similar etiological types found in the lay population.

Much has been said in the past concerning the disobedience of physicians as patients. Our own impressions are that, as a rule, physicians when ill are very cooperative and philosophical. Through a loyal sense of duty as physicians and, at times, through economic necessity, they may carry on with a fortitude that is amazing despite severe cardiac handicaps. Because they are cognizant of the danger and of the necessity for care they, in most instances, make better patients than laymen.

SUMMARY

(1) The etiological types of heart disease as encountered in the learned professions do not differ from the types found in the lay population.

(2) The criteria for the etiological diagnosis of the "unknown" group of cardiac cases of the American Heart Association need revision.

(3) Clinical evidence is presented to show that a diagnosis of hypertensive heart disease may be made even in the presence of a normal or subnormal blood pressure.

(4) The presence of peripheral arteriosclerosis of itself does not justify the diagnosis of arteriosclerotic heart disease.

(5) The coronary basis of angina pectoris is stressed.

(6) Patients with certain functional heart disturbances resulting from a lowered basal metabolic state should be placed in the hypothyroid heart group.

(7) The average physician with heart disease is a cooperative patient.

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523 Breslin Medical Building.

MALNUTRITION*

By J. Cyril Eby, Phar. D., M.D.,†
Plaquemine, La.

The malnutrition of the children of Iberville Parish, Louisiana, was a major health problem and the Director of the Parish Health Unit, after a careful survey and study, made every effort to correct this condition. The health nurse had taken weights and measurements of all the white school children in the elementary grades, and listed all the public and parochial schools that were 10 per cent or more underweight. The underweight varied from 47 to 69 per cent.

The percentage underweight of the children in the Parish schools is here given:

Plaquemine High School	69 per cent
Samstown	66 per cent
St. Gabriel	66 per cent
Crescent	61 per cent
Augusta	60 per cent
New Camp	59 per cent
White Castle	58 per cent
Shady Grove	55 per cent
Grand River	51 per cent
St. John's Parochial	47 per cent
St. Basil's Academy	47 per cent
Our Lady of Prompt Succor Convent	47 per cent

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†Director Iberville Parish Health Unit.

Iberville Parish is in southeastern Louisiana and the 1930 census shows the population as 23,610. There are three incorporated towns; the majority of the inhabitants live in the rural sections of the Parish. The chief agricultural products are sugar cane and rice. More attention has been paid to truck farms and gardening in recent years, but this is not general. Corn, tomatoes, beans, peas, carrots, onions, potatoes, sweet potatoes, melons, grow readily, but very few people in proportion to the population have gardens. Fruits and berries grow in profusion, though little effort is made to preserve the fruits and fruit juices. Fish, shrimp, and crayfish are plentiful in season. Fresh and salt meat are always obtainable.

In the winter months when grazing is short and the cows are not properly housed, there is a great shortage of milk. Much dry milk and canned milk are used.

To establish the Nutritional Clinic it was necessary to:

(1) Obtain food that could be used as a supplementary diet.

(2) Finance this proposition.

(3) Determine the best method of distribution.

(4) Secure consent to establish this clinic.

The Parish Health Unit consists of a director, health nurse, sanitary inspector, and secretary. The unit is under the jurisdiction of Dr. C. V. Akin, Director, Bureau of Parish Health Administration, Louisiana State Board of Health.

Valuable suggestions were given the director by Dr. Charles W. Strowger, Associate Director, Bureau of Parish Health Administration.

The Nutritional Clinic began February 3, 1930, and ended April 25, 1930. The purpose of this clinic as far as possible was to correct malnutrition.

Many varieties of food were considered before establishing the clinic, but the work of Dr. John J. McNamara, of Lowell, Mass., and his article, "Lowell Fights Undernourishment Among the School Children,"[1] also an article by Dr. Hilbert F. Day, "Sunshine Camp in Cambridge, Mass.,"[2] were convincingly in favor of milk and bananas.

No funds were at the command of the Health Unit to establish a Nutritional Clinic, so an appeal was made to the United Fruit Company asking it to donate bananas to establish this clinic, which it did for three months. Twelve bunches of bananas were sent each week for dis-

tribution. This furnished the children in the clinic during their school days two bananas each as a supplement to their lunch. Each child was given two glasses of milk with the bananas, during the school attendance. To obtain money for the milk fund a special benefit was given. Fifteen gallons of milk a day were used.

Because the milk supply was inadequate, Dryco milk was used in three of the rural schools, namely: Augusta, Samstown and New Camp, during the entire three months. One hundred pounds were used for the entire period.

Physical examinations were made of the children in the nutritional classes and their defects were noted. The chief defects were hypertrophied tonsils, also dental caries. Four children were mentally deficient, two children had heart complications and one child had a skin eruption. In *Group 1,* 47 had normal tonsils, 14 had their tonsils removed, and 37 had hypertrophied tonsils. In *Group 2,* 17 had normal tonsils, five had their tonsils removed and 40 had hypertrophied tonsils. The dental examinations were made by the dentists in the Iberville Parish. Ninety-six children were examined in *Group 1,* two being absent at the time of examination. Out of this group nine had perfect teeth and 87 required 250 extractions and 333 fillings to correct their defects. In *Group 2,* 62 dental examinations were made and four children were absent at the time of examination. Fifty-eight children required 90 extractions and 175 fillings to correct their defects.

On March 1, a severe epidemic of measles occurred in Plaquemine and the vicinity. Eighteen children in the nutritional group contracted measles, which necessitated their being absent from school two weeks. This worked against their general average.

One hundred and sixty children made up the nutritional classes. This was about 7.5 per cent of the total enrollment of the combined public and parochial schools in the elementary grades. For a matter of convenience the children were divided into two groups, namely: *Group 1,* ages six to nine, inclusive; *Group 2,* ten years and over. *Group* 1 contained 98 children, while *Group 2* contained 62 children.

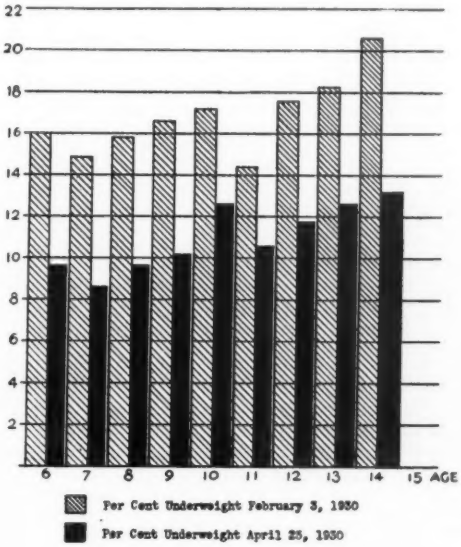
The children were divided into two age groups. On February 3 a tabulation was made of the children's ages, together with their actual weights on that date, and at the conclusion of classes on April 25 the children were again weighed and their percentage of underweight ascertained and gain noted. On February 3 the children in *Group 1,* ages six to nine, showed an average underweight of 16.2 per cent; on April 25, 9.5 per cent; showing a total gain for this group of 6.7 per cent. On February 3, *Group 2,* ages ten and over, showed an average underweight of 16.9 per cent; on April 25, 11.7 per cent; showing a total gain of 5.2 per cent.

Table 1 shows average underweight, according to age groups and per cent gained.

One reason for the high percentage of underweights in the groups was that many of the children were getting an unbalanced diet. This condition could be remedied if more people were

TABLE 1

Age of Children	No. of Children	Feb. 3, 1930, Average Underweight	April 25, 1930, Average Underweight	Per Cent Gained
6	19	17.8	9.5	8.3
7	26	15.1	8.5	6.6
8	20	15.9	9.5	6.4
9	33	16.5	10.1	6.4
10	12	17.0	12.5	4.5
11	13	14.4	10.8	3.6
12	15	17.5	11.9	5.6
13	14	18.3	12.8	5.5
14	6	20.7	13.1	7.6
15	1	14.0	6.0	8.0
16	1	20.0	18.5	1.5



Graph shows average underweight according to age groups, illustrating Table 1.

urged to cultivate vegetables, raise live stock, cows, sheep, and chickens. Everyone in the country should be urged to cultivate gardens, preserve, and to can vegetables and fruit in season.

From a public health standpoint this work that was carried on in the schools, had a psychological effect on many other undernourished children who could not be put in the clinic on account of lack of funds. These children supplied themselves with bananas and milk at their own expense. Marked development was shown in many children not in the clinic. All of the children were encouraged to eat a more balanced diet. In this section of the country, on account of economic conditions, the inhabitants live on a one-sided diet. The children lack the proper vitamins, which are made available by the consumption of milk and bananas, which contain vitamins A, B, and C, and the essential mineral salts.

Permission was obtained, and cooperation was given the Health Unit to establish this clinic by the Superintendent of Education and the School Board of Iberville Parish. Cooperation was gladly given by the principals, teachers and sisters in the various schools. Miss Juanita Aycock, health nurse, weighed and measured all the children, established classes in the various schools, photographed them. The director, health nurse and sanitary inspector delivered the bananas to the various schools in the Parish. This necessitated crossing the Mississippi River many times, as a part of the Parish is east of the river. All parts of the Parish were represented, and much territory had to be covered to visit the various schools.

SUMMARY

The improvement noted in the undernourished and underweight children of Iberville Parish was very marked, following a three months' period during which each child in the Nutritional Clinic in the various schools was given two glasses of milk and two bananas in addition to his regular lunch during the school day. A glass of milk and a medium sized banana contain not only a proper proportion of carbohydrates, fat and protein, but also the essential mineral salts that the body requires.

Vitamins A, B and C were found also in milk and bananas in goodly quantities.

From an economic standpoint, the results of this clinic should have a wide appeal to many southern localities where more attention is paid to a one-season crop. If there is a failure in this crop, for example, in sugar cane, cotton, or tobacco, the farmers are financially unable to purchase the foods needed for their general welfare. Hence, they are usually forced to subsist on a one-sided diet, which consists chiefly of an excess of carbohydrates.

More attention should be paid to the correction of physical defects, such as carious teeth, diseases and hypertrophied tonsils. Last, but not least, faulty health habits and dietary indiscretions should be corrected.

To improve the nutrition of the children, a well-balanced diet should be maintained; then malnutrition as a major health problem will cease to exist.

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LINGUA NIGRA: A CASE REPORT WITH CULTURAL STUDIES*

By ROBB SPALDING SPRAY, PH.D.,
Morgantown, W. Va.

In January, 1928, a case of "black tongue" was referred to our laboratory from the student health service of the University. This being the first case of the condition to come under my personal observation, I examined it quite thoroughly by microscopic and cultural methods. The initial examination revealed enormous numbers of a blastomycete form described below. Because of the results reported by Faber and Dickey[1] and others on the use of gentian violet, the patient was supplied with a 1-1000 aqueous solution and instructed in its local application.

The patient was not seen again until Feb-

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†Professor of Bacteriology, Medical School, West Virginia University.

ruary, 1929, about one year later, when he returned with the same condition. He stated that after a "few" applications the condition cleared up and the tongue returned to normal. However, a recurrence was noted some three weeks preceding his return, when a second examination and cultures were made with findings identical with those of the preceding year.

A review of the available literature, of which but a few references are cited, reveals only some 200 odd recorded cases of this condition, which is ascribed to various causes, from mixed or unidentified infection to trichomycetes, nocardia, leptothrix, streptothrix (Weidman),[2] or to undescribed or unidentified fungi, and to a blastomycete described by Lucet[3] in 1901 as *Cryptococcus linguae-pilosae*. Of all the suggested specific causes the latter organism seems to have received greatest attention, although the recent studies of Wells and Cooper,[4] Prinz[5] and Heidingsfeld[6] incline toward the theory of chronic irritation, mechanical or chemical, as the cause, together with individual hypersusceptibility, or certain ill-defined trophoneurotic disturbances in a large per cent of cases.

There appears to be quite a general concert of opinion, as expressed by Cooper, that two forms occur, one the rare true lingua nigra, the other the pseudo form which in many instances has been traced to simple chemical pigmentation, and which has been reproduced experimentally with nut-gall, chromic acid, silver nitrate and other active astringents.

It is not the purpose of this report to discuss the relative merits of the various theories of the etiology of this condition. These have been fully presented by the authors cited, who have supplied comprehensive bibliographies. Rather is it our idea to present a study of a single case, with recurrence, in which two strains of a closely similar yeast-like form were observed among the eroded papillae, with isolation, morphological and biological study of each. The fact that the patient showed the same type of organisms on both occasions, one year apart, and that the condition responded readily to the known fungostatic action of gentian violet, as cited above, strongly suggests, though by no means confirms, its specific fungoid etiology.

CASE REPORT

This patient, a young man twenty-five years of age, with a negative history of syphilis, and otherwise normal, displayed a tongue enlarged about one-third its normal size. The dorsum was deeply furrowed longitudinally and the posterior portion, extending to the anterior quarter, was as black as ink, with a rough furry surface. Patchy areas of erosion of a quarter centimeter diameter were observed, leaving a raw but not visibly bleeding surface, apparently extending as deep as the muscularis (since muscular fibers were noted on the microscopic examination of specimens removed). All the teeth except one molar were present and in good condition. The adjacent tissues, including the tonsils, were clear, and no eruption on the body was found.

A portion of a removed papillary fragment was teased in water. Low and high power revealed the eroded papillae which were deeply melanotic and keratinized. The normal papillary epithelium was entirely absent, leaving only the fibrillar structure. Between the eroded papillae were unorganized masses in which bacteria of various forms, chiefly cocci, were observed. However, there were plainly evident large numbers of spherical bodies, some 3 to 4 microns in diameter, as well as chains of larger elliptical bodies, some of which were clearly within short hyphal filaments (chlamydospores). Further observation, in which specimens were teased in 20 per cent sodium hydroxide, showed clearly a ramifying, branching mycelioid structure penetrating into the papillary crypts or deeper. This fungous form showed cylindrical septate filaments with lateral ovoid, spore-like conidial structures. The origin of the small spherical bodies was not determined, but further studies suggest that these may have been the second organism isolated.

Together with the above, typical budding blastomycete forms were numerous. These consisted, for the most part, of a primary ellipsoidal cell showing a single bud, although plural buds were observed. In sodium hydroxide a double contour was clearly seen in many cases, though not in the majority of cells.

In view of the reports of others on the association of trichomycetes, streptothrix, nocardia and similar forms, considerable care was exercised in an attempt to confirm their presence in this case. Such forms, with the exception of a few strands of a probable leptothrix type, were not observed.

Isolations and Cultural Studies.—The tongue was scrubbed with a swab of sterile saline and with a second swab a small patch of papillary tissue was removed and inoculated onto Sabouraud's maltose agar and onto a modified North's gelatin agar. Duplicate cultures were incubated at 37° C. and at room temperature.

After 24 hours incubation at room temperature the Sabouraud's medium displayed an abundant, almost confluent growth of whitish, round, glistening colonies of distinctly two sizes. A few tiny colonies, later identified as staphylococci, were also present.

At 37° C. a confluent thick creamy-butyrous growth developed in 24 hours. Stains from this growth showed a predominance of budding blastomycetes, heavily mixed with staphylococci and a few streptococci, together with numerous gram-negative unidentified bacilli.

Colonies of both the large and small size were plated onto Sabouraud's agar from the room temperature culture. Stains from these resulting cultures showed each to have characteristic blastomycete morphology. Selected colonies were twice replated for purity, and two colonies of each, labeled "large colony" and "small colony," were isolated for stock cultures.

(*A*) *Large Colony Strain.*—On Sabouraud's or North's agar, at 24 hours, the colony is circular, 1 mm.

in diameter, or slightly larger (reaching a maximum of 3.5 mm. at four to five days) deep rounded, smooth, glistening and creamy white. No evidence of mycelioid structure or of superficial sporulation has been observed. Plate cultures have a strong yeast odor. Microscopically it shows a typical blastomycete with single and infrequent plural budding, strongly Gram-positive, and with no trace of mycelium within the first 7 days. The fully developed blastospores measure from 10 to 11 by 6 to 7 microns, are almost perfectly ellipsoidal in contour when budding, and spherical in the resting stage. In sodium hydroxide a double contour was frequently observed, though not strongly characteristic.

Stains were examined from North's gelatin agar at 1, 2, 4, 7, 11 and 21 days. At no time were more than traces of mycelioid growth seen. The organisms stained progressively were granular, and at 11 days secondary colonies began to appear in the confluent growth. Stains from these areas showed enlarged spherical cells 12 to 15 microns in diameter, staining Gram-negative, with four and five apparent buds on their periphery. Although these secondary colonies suggested the ascus stage, and although the large cells were carefully stained and examined, no traces of ascospores were seen.

Cultures were exposed on sterile gypsum blocks and stains were made daily for twelve days. No ascospores were observed at any time.

Gelatin stab culture, incubated at room temperature, showed stab growth with rhizoidal filamentous structures radiating about the stab. The surface showed heavy "nail-head" growth of the Friedlander bacillus type. The gelatin was not liquefied in 41 days. Stains of material removed from the deep rhizoidal growth showed an abundance of mycelioid filaments with diagonally lateral singular sporulation.

Litmus milk remained neutral, or but perceptibly acid, with slight reduction at 14 days. A soft coagulation appeared first at 6 days, but with no evidence of peptonization.

(*B*) *Small Colony Strain.*—On Sabouraud's and North's agar at 24 hours, both at room temperature and at 37° C., the colonies are very tiny, streptococcus-like, though more opaque, not larger than 0.5 millimeters in diameter (reaching a maximum of 1.5 millimeters in 4 to 5 days). Plate cultures have a slight yeast-like odor much less evident than that of the large colony strain.

Microscopically the organisms resemble those of the large colony strain, except in size, being only some 6.5 to 7.5 microns in length (checked by Cooper[7]), with traces of fragmentary mycelium. The organisms were sharply Gram-positive and showed active single and infrequent plural budding. In sodium hydroxide a double contour was quite evident on the larger cells.

Stains from carbohydrate serum-water showed typical blastomycete morphology with active budding. Mycelial development was decidedly scant, showing only slight traces of clavate outgrowths from a few blastospores, some of which outgrowths at the same time displayed terminal and lateral single buds (conidi).

Cultures were exposed on sterile gypsum blocks and stains made daily for 12 days. No ascospores were observed at any time.

Gelatin stab cultures showed moderate surface growth, with a trace only of growth extending along the stab. No rhizoidal outgrowth was observed, and there was no liquefaction up to 41 days. Stains from the gelatin showed only the yeast-like budding forms, no mycelial tendency being seen.

Litmus milk remained neutral, with no reduction nor coagulation. Stains from milk revealed very poor growth and only yeast-like singly budding cells.

Fermentation Reactions.—Duplicate cultures of both strains were inoculated into 27 carbohydrates, etc., made up in serum-water. These tests have been repeated thrice, making four tests in all, and with only minor differences in degree of acidity and amount of gas, they have checked in all tests. Daily readings of acid, coagulation and gas were made for 7 days. In no case did duplicate cultures fail to conform, and we believe that the reactions recorded in *Table I* represent the fermentative capacities of these two strains, and that they indicate that the two, arising by inoculation from the same case, are quite similar but distinct organisms.

Carbohydrate media were prepared in 0.5 per cent concentration in serum-water (pH. 7.2), and later in 1 per cent concentration in sugar-free casein-digest broth, prepared according to Kahn.[8] These were autoclaved at 12 pounds pressure for 15 minutes and incubated for sterility. As a check on decomposition of the more unstable polysaccharides they were tested as follows: arabinose with *Sal. suipestifer;* xylose with *Sal. paratyphi;* maltose with *N. gonorrhea;* and trehalose with *Sal. schottmuelleri.* Fermentation was negative in all tests.

All carbohydrates fermented in serum-water were checked in Dunham tubes of casein-digest broth and gave reactions which checked fundamentally in all except trehalose which, in the case of the large colony strain, gave slow acid fermentation in serum-water, but in digest-broth showed gas only after 72 hours, increasing to 30 per cent at 7 days.

The large colony type showed an increasingly heavy pellicle formation with no enmeshed gas bubbles at from 3 to 7 days in serum-water, and at 7 to 10 days in digest-broth. The small colony strain showed no pellicle in either fluid medium. According to Cooper, the pellicle formation of the former might suggest cryptococcus, although he does not refer specifically to serum-water, on which we find pellicle most abundant.

Microscopic examinations were made daily from both serum-water and digest-broth cultures. In digest-broth, both strains showed only ellipsoidal budding types, with but traces of brief, unbranched hypha-like structures. Budding was typically singular, though double budding was not uncommon.

Stains of the small colony strain in serum-water, both fermented and unfermented (pH. 5.6 to 7.2), showed only the blastomycete type, with rare traces of hyphae. However, stains of the large colony type, at 50 hours and onward, showed most interesting variations. In the non-fermented media (pH. 7.2) the growth was typically blastomycetic, as on North's and Sabouraud's agar. However, in maltose, and especially in levulose, both fermented (pH. 5.6). The growth was predominantly mycelioid in character, with fragmentary and extended branching hyphae distinctly septate. These filaments, some 3 microns thick, showed numerous diagonally lateral single, clavate and pyriform buds (conidia). The typical yeast budding seemed to be reduced to comparative inactivity. The picture was remarkably similar, except for the absence of the internal bodies (chlamydospores ?), to that observed in direct stain from the tongue of the patient.

TABLE I

Fermentative Reactions in Serum-Water plus 0.5 per cent of Carbohydrates, etc., with Brom-Cresol-Purple Indicator.

		Dextrose	Levulose	Galactose	Arabinose	Xylose	Rhamnose	Lyxose	Lactose	Sucrose	Maltose	Raffinose	Mannose	Melezitose	Trehalose	Dextrin	Inulin	Starch (Soluble)	Glycogen	Salicin	Glycerol	Dulcitol	Mannitol	Inositol	Sorbitol	Adonitol	Perseitol	Erythritol
Large Colony		+ + +	+ + +	+ +	+	+									+			+ + +					+					
Small Colony		+ + +	+	+	+	+		+							+			+										

READING DOWNWARD, Acid, Coagulation, Gas

Reactions below recorded from references (11, 12, 13). Nature of stock medium not stated, presumably sugar-free broth.

		Dextrose	Levulose	Galactose	Arabinose	Xylose	Rhamnose	Lyxose	Lactose	Sucrose	Maltose	Raffinose	Mannose	Melezitose	Trehalose	Dextrin	Inulin	Starch (Soluble)	Glycogen	Salicin	Glycerol	Dulcitol	Mannitol	Inositol	Sorbitol	Adonitol	Perseitol	Erythritol
Zeisler "Kl"		A G	A G	G		G?			GS	A G	A G				0	0	GS			GS	0	0	GS			0		
Beeson-Church		A G			0	0			0	0	A	0					0			0		0	0		0			
Peckham "Yeast 45"		A G	A G	A					0	A	A G					0	0											
Monilia metalondinensis Castellani		G	G	G	0	0	0	0	0	0	G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE II

Fermentation Reactions in Sugar-Free Casein-Digest Broth Plus 1 per cent Carbohydrates, with Brom-Cresol-Purple.

	Dextrose	Levulose	Galactose	Arabinose	Xylose	Rhamnose	Lyxose	Sucrose	Maltose	Mannose	Trehalose	Starch (Soluble)	Mannitol	Sorbitol
Large Colony	A G 70%	A G 90%	A 0	A± 0	A± 0	0 0	A? 0	A± 0	A G 75%	A G 75%	A G 30%	A 0	0 0	0 0
Small Colony	A G 75%	A G 65%	0 0	0 0	A± 0	0 0	0 0	0 0	0 0	A G 90%	A G 50%	0 0	0 0	0 0

Percentage of gas records maximum, which occurred variably from 60 to 96 hours.

This mycelial tendency was exceedingly variable in amount and appearance in the various carbohydrates and the picture was entirely different from that observed in stains of the same culture on solid media. In view of this variability, one can but wonder what reliability, if any, may be placed upon morphological classification unless the nature of the medium, its reaction and the age of culture are carefully specified in the studies of members of this group.

Thus it appears that the two strains, differing markedly in morphological as well as fermentative characteristics, although isolated from the same case, are distinctly different cultures.

Animal Inoculations.—Both strains (cultures of the sixteenth generation) were washed from 24 hour North's agar slants in sterile saline and animals were inoculated as follows in pairs, respectively, with large colony and small colony:

Two adult rabbits received 1 ml. intravenously. No reaction was noted, and the animals were alive and well on the fifteenth day.

Two adult rabbits received 1 ml. subcutaneously. No local nor systemic reaction was noted and the animals were normal at 50 days.

The same two animals were inoculated by scarification of the tongue, into which the respective cultures were rubbed vigorously by swab. No evidence of infection was perceptible at 1, 3, 5, 10, 15 and 20 days. On these same days swabs from the tongues were inoculated to Sabouraud's agar. The organisms were not recovered, even at 24 hours, and had evidently failed to infect.

Two guinea pigs of about 280 grams weight received 0.5 ml. subcutaneously. The one receiving the small colony culture showed no visible reaction. However, the one receiving the large colony culture showed an increasing swelling at the point of inoculation, first apparent at 8 days. This increased in size and ruptured on the thirteenth day, draining a sero-purulent fluid. Stains and cultures from the discharge were negative for blastomycetes on the thirteenth day, and again on the fifteenth day. Various staphylococcus types and contaminants were the only organisms recovered by culture.

One adult guinea pig received 0.5 of the small colony strain intraperitoneally and showed no reaction, being alive and normal at 50 days. One guinea pig only 4 days old received 0.5 ml. of the large colony strain intraperitoneally with no visible reaction, and was alive and well at 50 days.

Both of these strains were sent to Dr. Steinfield,[9] who reported: "Two young rabbits were injected intravenously with 1 c. c. of saline suspension of glucose agar culture (large colony strain, author's note). Both animals died in three days. Multiple miliary abscesses were noted in the liver. These consisted of typical asci containing spores. On subculture they again took the original yeast cell characteristic. . . ."

His observations are sharply in contrast with our results on animals and our failure to demonstrate ascospore formation on gypsum blocks. His animals were inoculated with probably the third or fourth culture generation, while ours were inoculated with the sixteenth culture generation. The results again exemplify the uncertainty attached to animal inoculation with cultures of varying ages under artificial conditions. We regret that direct human to animal inoculations were not performed.

DISCUSSION

We have attempted, without success thus far, to identify these two strains as known organisms, using the keys of Castellani.[10] The mycelioid growth in certain mediums of the "large colony" strain would suggest monilia. The double contour of some cells and the pellicle on broth and serum-water cultures would suggest cryptococcus. The low-grade fermentation of a few carbohydrates would eliminate the ordinary saccharomyces which might be normally present in the mouth. The plural budding, and especially the ascospore formation reported in animals by Steinfield, would rule out cryptococcus. We would, however, again emphasize our failure to observe asci under any condition of cultivation. The gross character of growth would not suggest oidium.

From our review of the records this strain

appears to conform rather closely to the characteristics of Castellani's *Monilia metalendinensis* group, although it resembles even more closely the strain described as a cryptococcus variety, isolated from skin lesion, by Zeisler[11] and one reported by Beeson and Church[12] from the skin of a hand, as well as one studied by Peckham[13] from a "sore throat," which showed budding on solid media, but branching mycelium with lateral and terminal chlamydospores in fluid media. She associates her culture with Castellani's *M. pinoyi* group.

The small colony strain has been only tentatively placed as a probable member of the cryptococcus group. In the limited literature bearing on the description of this group we do not find sufficiently distinctive biochemical, and especially fermentative reactions, on which to base a positive identification.

Prinz[5] discusses comprehensively and convincingly the various non-infectious theories of causation of this condition, while Wells and Cooper[4] and Cooper[7] emphasize the distinction between the common "pseudo, or non-fungoid," and the "true or fungoid" types.

While yeast-like organisms are not infrequently encountered in the normal human mouth, and admitting that their presence, even in large numbers in this pathologic condition of the tongue, does not imply a necessary etiologic relationship, we feel that this case should be added to the growing list of cases in which a predominating fungous flora was evident.

The fact that the initial attack responded favorably and rapidly to treatment with gentian violet would support the suspicion that this case was of some specific Gram-positive infectious origin.

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DISCUSSION (*Abstract*)

Dr. Ernest W. Goodpasture, Nashville, Tenn.—I should like to ask Dr. Spray what this pigment is and what relation it has to the condition; also whether there is evidence that there is any inflammatory reaction in relation to the blastomycetes.

Dr. Spray (closing).—I was interested particularly in the microscopic and bacteriologic phases of this case and did not go into the chemical aspects. Dr. Prinz, of the dental school of the University of Pennsylvania, has discussed this subject fully. I am sure that the discoloration in this case was not chemical deposit, but was due simply to necrosis and drying of the extensive papillary outgrowths.

Regarding the question of an inflammatory reaction to the blastomycetes, none was observed, other than the papillary proliferation and hypertrophy. At first I observed what I thought to be a round-cell infiltration, but further study showed these bodies to be what I regard as probably the small-cell type of blastomycete.

In routine examinations of throat cultures we infrequently encounter yeasts. They are rather uncommon, so that their presence, in this case, seems quite suggestive of their possible specific relationship.

A NEW METHOD FOR THE TREATMENT OF STRICTURE OF THE URETHRA*

By GEO. R. LIVERMORE, M.D.,
Memphis, Tenn.

Having been impressed with the fact that little or no scar tissue resulted from the destruction of bladder and urethral papillomata by fulguration, I applied the bipolar current to a dense traumatic stricture of the bulbo-membranous urethra which had resisted dilatations and external urethrotomy. The result was so striking that I now use it in all urethral strictures which do not promptly respond to dilatation. The electrode is applied to the stricture through the urethroscope, the bipolar current turned on and the strictured band or bands thoroughly fulgurated. It has been my practice to fulgurate at one point, endeavoring to apply the electrode entirely across the strictured tissue.

In a week or ten days sounds are passed and one will be surprised at the ease with which a sound (larger than one which had passed with difficulty before fulguration) will then slide on through the stricture.

This is only a preliminary report, but will be followed later with my results in a series of cases.

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HYSTERIA WITH EXTENSIVE URTICARIA AND PAROXYSMS OF CHOKING AS MAJOR SYMPTOMS: CASE REPORT*

By L. A. GOLDEN, M.D.,
Birmingham, Ala.

When Charcot, in his brilliant series of lectures at the Salpetiere in 1880, called attention to the protean manifestations of hysteria, to its baffling peculiarities, and to the frequency of its appearance in the medical wards, he crystallized the dawning recognition of this disorder as a major problem of medicine. Further impetus was given to its study by the contemporaneous writings of Briquet and the German and British clinicians, and a serious effort was made to explain and find a cure for it. In the years which have followed comparatively little has been added to what was said by those pioneer neurologists.

I should like to describe briefly a patient who suffered from an unusual symptom-complex based on this emotional disturbance which Charcot called "The Great Neurosis." Her chief complaint was of recurring attacks of urticaria with alarming symptoms suggestive of laryngeal obstruction. The case has additional interest because of the many long continued and futile attempts at finding a cause.

The history is that of a young women of twenty-six years, who, without adequate mental or emotional preparation, married at the age of fifteen and immediately assumed responsibilities which carried an unusually large quota of difficulties and tribulations. The death of her mother and father and the desertion of her husband all came in quick succession, and she was left bewildered and entirely unprepared for her responsibility of supporting and rearing her two young children. Added to her other troubles was the nagging and unsympathetic attitude of her near relatives and the unjust treatment received at their hands. This series of psychic insults to a young woman already lacking in emotional stability seems to have been too much.

The eruption of which the patient complained consisted of urticarial plaques which appeared suddenly and varied in size from that of a pea to that of the palm of the hand. The itching was distressing. Paroxyms of choking would last for hours, sometimes most of the night. She was given the usual sensitization tests, including those for food, plant and animal products and drug reactions, which were all frankly negative. Because of her choking spells, the esophagus and bronchial tree were examined at various times without revealing anything unusual. No foci of infection or evidence of toxic absorption could be demonstrated. X-ray examination of the gastro-intestinal tract and gastric analysis all showed nothing unusual. The stools were examined and cultures were made without noteworthy results. The blood chemistry, especially the calcium content, was repeatedly studied and always found normal. The Wassermann and Kahn tests were consistently negative. There was no fever. The urticaria involuted promptly upon the administration of adrenalin, but the paroxyms of choking were apparently uncontrollable. Among the drugs given without benefit were calcium, afenil, cinchophen, thyroid extract, coal tar derivatives, morphine, belladona, valerian, ether, and ephedrine. The patient at this time came to our service, and after careful study of her previous history and treatment, the following considerations suggested that her troubles rested upon a purely nervous basis:

(1) The attacks of severe choking with paroxyms of coughing which lasted for hours were not associated with cyanosis or with increase in pulse rate, regardless of the severity of duration of the attack; nor was there any physical evidence of trouble in the chest.

(2) An attack never developed except in the presence of other people, usually during visiting hours. Lack of attention usually brought on an attack of urticaria and choking. The visits of unfriendly relatives often precipitated an attack, as was evidenced by the dramatic appearance of symptoms when she was visited by an aunt who was decidedly antagonistic, and their prompt disappearance when visited by another aunt who was more friendly. This episode occurred in the sequence stated on three separate occasions within one week.

(3) She never injured herself in any way during the attacks.

(4) There was marked dermatographia.

(5) The patient described without prompting the typical globus hystericus.

(6) She exhibited areas of anesthesia with frequent changes in cutaneous sensation, which were markedly affected by suggestion. There was no evidence of organic change in the nervous system.

(7) As a final therapeutic test, she was removed to a private home amid pleasant surroundings and was abundantly assured that neither her condition nor her outlook on life was essentially serious. She finally became convinced that she need expect no more spells while following the advice of her physician. She has had no recurrence in the past several months, although the attacks had been of almost daily occurrence while she was in the hospital.

(8) The patient's early marriage and the resulting psychic trauma seemed sufficient to produce a fertile soil upon which the development of hysteria was possible.

It seems fair, then, to conclude that the extensive urticaria and alarming choking symptoms which the patient exhibited were the expressions of hysteria. The obscurity which surrounds most cases of urticaria and the frequent suspicion that emotional factors play a role in its productions lends special interest to this case.

Hillman Hospital.

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SIMPLIFIED METHOD OF BLOOD CHEMISTRY ANALYSIS*

By JOSEPH MATTHIEU, M.D.,
Miami, Fla.

Chemical examinations of the blood have, during the last few years, become a very important factor in diagnosis and treatment. It is a distinguished merit of American biochemists to have devised blood chemistry methods which are within the reach of the average hospital laboratory, but the facilities of such a laboratory are not at the disposal of every practitioner having cases in which chemical blood examinations would be desired. It is the purpose of this paper to call attention to the fact that nowadays, even without the help of a special laboratory and without trained technicians, most of the chemical blood examinations which are of interest can be carried out in the office of the average practitioner without involving any expensive equipment.

We wish to discuss some of these methods. One of the changes which enable one to carry out the work in such a simple, inexpensive, time-saving way has been developed by the laboratory of the Jackson Memorial Hospital. An important step in blood chemistry procedures is the so-called precipitation of the blood in order to obtain a protein-free filtrate. The method actually in use not only in this country but all over the world is that by Folin with the aid of tungstic acid. The great advantage of this method lies in the fact that one and the same filtrate can be used for a large number of different examinations, as sugar, non-protein nitrogen, uric acid, chlorides and creatinin. This very popular method is, as is well known, carried out in the following way:

One part of oxalated blood is hemolized with seven parts of distilled water. One part of 10 per cent sodium tungstate is then added and finally, drop by drop, one volume of two-thirds normal sulphuric acid. We need not describe the procedure in more detail, as we have replaced it by a much simpler one, consisting of one step only and requiring only a single reagent. This reagent has the following composition: 10 grams of sodium tungstate are dissolved in 1,000 c. c. of 1/15 N. sulphuric acid. The solution is stable for at least three months. Sometimes a slight precipitate occurs after a few days, but this does not interfere with the method. In this case, the reagent should be shaken before being used. It is recommended to cover the surface with some toluol.

The new procedure is as follows: one part of oxalated blood is added to nine parts of the reagent. It can be filtered immediately. The filtrate can be used exactly in the same way as the one obtained by Folin's method. The advantages of the new method are: (1) only one reagent is necessary; (2) saving of time and glassware; (3) in using the new method, the filtration takes place about five times faster and delivers more filtrate, consequently less blood is needed for the same tests; (4) the filtrate is clear without exception. This is not the case in Folin's method. You will appreciate these facts, as the following demonstration shows you both methods at the same time.

For final color comparison, a real colorimeter is advisable, but not essential. For most clinical work it is sufficiently accurate to put standard and unknown in two graduated test tubes of equal size and shape, to dilute the stronger solution until its color matches the other tube, and to calculate the concentration of the unknown from the required dilution. We believe this procedure furnishes results which are correct within about 1 per cent.

As all the solutions, standards and the reagents can be supplied readily for use by almost any company, we feel that the usual methods of blood chemistry are within the reach of the average practitioner.

*Clinic, General Clinical Session, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

TWO ADDITIONAL YEARS IN COLLEGE VERSUS TWO MORE YEARS IN HOSPITAL*

By WILBURT C. DAVISON, M.D.,
Durham, N. C.

In order to keep this question within bounds three premises must be accepted: first, that it is usually necessary for economic or domestic reasons that a physician enter practice at the average age of twenty-seven years;[1] second, that the average age of medical graduates who have had four years of pre-medical preparation and one year of internship is twenty-seven years;[1]

*Read in Section on Medical Education, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

*From Duke University School of Medicine.

and, third, that it is highly desirable that these graduates should have three years of hospital training so as to be as well equipped as possible before commencing practice. It is, of course, obvious that if it were practical for many physicians to defer practice until the age of twenty-nine or thirty years, a long college preparation before medical school and a long hospital training afterwards would be desirable. However, experience has demonstrated that the graduate terminates his training before these ages and consequently his pre-medical preparation or his post-medical training is sacrificed. It is true that a graduate can enter practice long before he is twenty-seven years of age, if he has a short preparation, both before and after medical school, but, although there are exceptions, these men do not represent the better trained physicians under discussion here.

If these three original premises are granted, and it would seem impossible not to do so, the solution of the question lies in weighing the advantages of two additional years in college or in hospital. The advocates of a college degree for admission to medical school advance two main reasons: first, the impossibility of obtaining an adequate pre-medical preparation in less than four years of college work, and, second, the cultural value of a complete college course. There is only one argument in favor of two more years in the hospital, but it is potent, namely, that an adequate medical training is usually impossible without it.

(1) *Adequacy of a Pre-medical Preparation in Two Years of College Work.*—A generation ago, it was true that four years of college work were usually necessary for an education, but, as shown in *Table I*, the high school of today, except for psychology and the classics which will be mentioned later, provides training comparable to that of the college of the nineties. A glance at any college catalog will demonstrate that a knowledge of the necessary pre-medical sciences, biology, chemistry, mathematics and physics, can be acquired in the first two college years and still leave time for courses in English, history and other humanistic subjects. It is true that a reading knowledge of French and German cannot be obtained during two years of college work if the requisite amount of science is studied, but linguistic ability is no longer necessary; in fact, most medical students who have it on admission to medical school lose it before graduation.[4] The old argument that students who have had four years of college work make better records in medical school does

TABLE I

A Comparison of the Curricula (Four Years) of 1893 of Duke University and Princeton University With Those of Modern High Schools

Subject	Duke University —1893 (Formerly Trinity College) A.B. (B.S.)‡ Semester Hours	Princeton University, 1893 A.B. (B.S.)‡ Semester Hours	Detroit, Michigan High School 1915-1918 (2) Semester Hours†	Wisconsin High Schools, 1924 (3) Semester Hours†
English	14 (14)	9 (9)	8	8
Latin	15 (0)	18 (0)	8	8
Greek	14 (0)	20 (0)	6	-----
French	0 (13)	5 (9)	8	8
German	-----	2 (13)	8	8
Mathematics	15 (15)	18 (18)	8	8
Drawing	0 (4)	0 (12)	8	8
History	11 (4)	2 (0)	8	6
Political Science	2 (2)	5 (2)	1	8
Philosophy	6 (6)	1 (0)	-----	-----
Psychology	6 (6)	6 (0)	-----	-----
Logic and Ethics	8 (8)	3 (3)	-----	-----
Physics	2* (4)	11 (9)	2	2
Chemistry	12* (19)	5 (11)	4	4
Biology	8* (17)	5 (18)	4	8
Electives*	27* (28*)	30 (36)	67	64
Total	140 (140)	140 (140)	140	140

*Elective courses may be taken in any of the above subjects.

†The Detroit, Michigan, and the Wisconsin curricula were selected as examples of the better high schools. The various courses were given in years but the semester hours in Table I are calculated on the basis of two semester hours per year. It is probable, however, that several of these courses are of greater value.

‡Figure in brackets indicates the number of semester hours in the Bachelor of Science curriculum.

not hold water.[5] There is no relationship between the quality of the student's intelligence and the quantity of the hours spent in college. Two additional years in a college in which the gifted student is not given special advantages frequently cause habits of academic indolence. In fact, medical students who are nineteen or twenty years of age usually learn more rapidly than those twenty-two years of age. Furthermore, two years of training in the basic sciences after graduation from medical school are more valuable than the junior and senior years in college for those who later are to do scientific investigative work in medicine.

(2) *The Cultural Value of a College Course.*—Education and culture are terms which are not synonymous, although they are often confused. The former indicates acquisition of information, while the latter denotes an appreciation of beauty. Anyone can obtain an education but, unfortunately, culture appears to require an innate capacity. College may increase this quality but rarely produces it. In response to a questionnaire, ten years after graduation, the alumni of one university reported that:

"The benefits of a college education were: general cultural background, mental discipline, increased ability to think clearly, awakened appreciation of finer things in life, creation of a desire for further knowledge, friendships made and a better understanding of other men, technical equipment for professional life, self-confidence acquired, and a better scale of value established."[6]

However, an analysis of the members of another class at this university indicated that among 331 members, 35 may be said to have culture, but of these only three apparently acquired it in college. The remaining 32 had it on admission. In other words, 1 per cent of this class profited from the cultural value of a college course. The dean of another college recently stated that for every student who acquires culture from the study of the classics, 100 learn the means of avoiding it. To those who had criticized the materialistic policy of encouraging pre-medical students to concentrate on courses in science, he answered that the great curse of college is lack of motivation and that floating culture starts with the clouds and goes up.[7]

(3) *The Value of Two More Years in Hospital.*—Everyone admits that additional postgraduate hospital training is valuable not only to provide technical skill in the practice of medicine or surgery, but also to enable the graduate to digest the mass of information which he has accumulated during the over-crowded medical curriculum.

CONCLUSION

Since the majority of medical graduates are 27 years of age by the time they have had four years of college preparation before medical school and one year of hospital training afterwards, and since three years of hospital training are essential for an adequate medical training it would seem desirable to sacrifice the two additional years in college for two more years in hospital. However, like questions on religion and politics, this problem cannot be solved by logic.

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DISCUSSION (*Abstract*)

Question.—Would the last two years of internship be compulsory in the beginning?

Dr. Davison.—Internships should be voluntary if possible, in order not to destroy the man's initiative in finding the particular hospital which he thinks he needs. If graduates do not take them, however, they should be compulsory. There are at least two ways in which an internship can be made compulsory, withholding the degree or requiring a bond. In some states, the former method would be a hardship because a degree is necessary for an internship. The second method is followed in some universities with Ph.D. students who wish to publish their theses after they obtain their degrees.

Dr. W. S. Leathers, Nashville, Tenn.—A number of students have consulted me as to whether they should take the additional two years of college work if the combined B.A. or B.S. course is offered. The idea is to use the time that would be devoted to one or two years of academic studies to hospital service following graduation in medicine. This would appear to be economical and is doubtless necessary in case of some students. I should be inclined to advise a student to do this, if he has financial difficulties and it becomes evident that he should use economy in both time and money in completing his medical training. However, I think it would be most unfortunate for medical educators to assume an attitude of advising students to shorten the college course, provided they are desirous

of going ahead with it. Many students wish the discipline and culture which would be attained in this way, and I, for one, would encourage these men to avail themselves of this advantage in acquiring an education. It seems to me it would be undesirable to have an inflexible plan of two years of college work, and then the medical course followed by an internship. There are many students who wish to take the full four years' college course. There are others who go further and secure the master's degree and then begin the study of medicine.

I agree with Dr. Davison that it is desirable to reduce the time spent in preparation so that a man may enter upon his career in medicine earlier in life, but the question is how that can best be accomplished? Personally, I believe that much can be done by decreasing the time devoted to finishing the work in the secondary school. It is possible to save one or two years during this period of one's training. There is a good deal of loafing on the part of students in the secondary school. Many classes are prevented from going ahead as rapidly as would be possible for the more capable students, and as a consequence this group has to beat time, so to speak, while the teacher is coaching the group of poorer students. If our educational system were so developed as to permit the better class of students to go ahead with their work and finish sooner, these pupils could save, as I have indicated above, usually from one to two years' time. Moreover, it is from this group of men that we wish to draw students for the medical school.

No one will discount the importance of necessary hospital training before entering upon the practice of medicine, but I do not believe that any plan should be adopted which will encourage students to reduce the college work uniformly as much as two years, in order to acquire this additional training. However, I am convinced that something can be done in decreasing the time required for finishing the course in the secondary school. Dr. Davison's discussion was stimulating and suggestive, and I think that such problems should be considered in order that we may improve at every point possible the plan of medical education in this country.

Dr. Russell H. Oppenheimer, Emory University, Ga.—If the question is whether a boy should spend two additional years in college or in the hospital, I think the answer is distinctly in Dr. Davison's favor. What we need is a means of bridging the gap between knowledge and its application.

At graduation the medical student has an enormous mass of information, but he is not yet capable of applying it in his study of the patient, at least not fully capable. It requires hospital training and experience to develop logical methods of medical thought.

If you talk to medical students you will find they are planning for longer and longer hospital work before going into practice.

Dr. I. I. Lemann, New Orleans, La.—Medical students abroad reach the beginning of their studies earlier, I think, than we do in this country. We, in the past, laid such stress upon the A.B. degree that we have encouraged students to remain a longer time away from their professional study than they have abroad. On the other hand, I believe Dr. Davison has laid too much stress upon his definition of education as a means of accumulating facts, whereas the stress, it seems to me, should be laid upon the training. As a teacher of third year medical students for a long period of time, a teacher of medical students at the time when they are first approaching their clinical work, I have been for a long time impressed by the fact that while many of them held degrees, few of them were really educated. Most of them have a mass of information, but few of them know how to use it. In approaching this matter we are taken away back, not only into the secondary schools, but into the primary schools, and many of our difficulties as medical educators find their roots in the troubles of the primary and secondary schools as well as of the colleges. There was a time, and the time still exists, when in many places college courses consisted in the gathering up of a certain number of credits in unrelated fields. That means simply the accumulation of facts; it does not mean education. Therefore the argument cuts both ways. If we can have come to us in the medical school well-trained men with the equivalent of two years of college work, those men are better students and are students to be preferred to the men who have four years of college education. I should say not education but rather four years' college career, but without much education, without much training.

I am still further impressed with the fact that the trend of our discussions this morning, as well as the thoughts which were stimulated by Dr. Rappleye's discourse at luncheon and this discussion this afternoon, the trend of our discussions is in the direction of schematizing, or diagramming, our needs and our troubles and arranging our courses. We fail to individualize, and I think we should not run into so many difficulties if we took the same trouble in analyzing, as well as the needs of the curriculum, the needs of the individual student. I think some students will come very well to us after two years of college work, and others may reach the bachelor's degree at an equally early age and with a better training. If either of my two sons had indicated the intention of studying medicine I should have urged upon him the completion of his college career. Again, there comes in the economic condition of the student and of his family, as well as his age.

Dr. J. T. Westerman, Miami, Fla.—Possibly the point of view of a general practitioner who has had an inadequate pre-medical education, an adequate clinical education, and an inadequate hospital training may be of some value to you. If a man has an instinct to culture, nothing, I think, will prevent his acquiring it. From the standpoint of the public, medical education is a concrete thing. You are turning out men to serve the public, and from your standpoint that is your main object. Two years of cultural education will not make a man cultured. If he has the instinct for culture, he will have culture. He can not be cultured by education, and if he has the instinct for culture nothing will prevent him from getting it. If you have the instinct for becoming educated in the general sense, I think, as someone said, there is a certain amount of culture to be gained from living. It is not, as someone said when I was a young man, that if a man has not Latin and Greek he is not a gentleman.

Dr. Ralph H. Chaney, Augusta, Ga.—In education, from primary education through professional, we have a case of Forditis; too many of our students are trying to fit bolt No. 220 into hole No. 147. They have the knowledge that this bolt goes into a certain hole, but have no knowledge of fitting the bolt into the entire system. The speeding up of production and mass production have entered into our educational system. If you go into our schools you will find that the

retarded pupil is now being taken care of; they are trying to bring him up to normal. But there is no means in our present public school system of taking care of the child who is above the normal, of the precocious child, if you wish to use that term. So, even down below the grammar grades you will find 25 per cent of the students who are wasting 35 per cent of their time. I have been watching in my own family the matter of wasted time in the development of four children. The two boys in the second grade say, that what the teacher gives them to do does not take them any time, and they play. They admit that they play four-fifths of their time.

It looks now as though the little girl in the kindergarten will overtake them in a short period of time. Can we do away with mass production and turn to an individualistic system, so that we can advance our students earlier? It seems to me that the English tutorial system was very good, and I believe our retardation in educational processes comes largely from our endeavor to educate everybody, causing a waste of the time of the brilliant few.

Dr. Willard C. Rappleye, New Haven, Conn.—The numbers of applicants for admission to medical schools with more than the minimal requirements of college work greatly exceed the facilities of the medical schools. Some schools have several times as many applicants with full college training as they can accept. It is not likely that, under these circumstances, a medical school will take less in the way of preliminary education of its students than it can get. No method of prediction has been devised yet to permit the selection of students early who are most likely to do well in medicine. We know that many of the best students spend more time in some courses than is required. An effort to select students too early may not get the best.

The average age of graduation from medicine is twenty-six and a fraction years; the mean age is a little lower. Both are as low as they were twenty-five years ago and compare favorably with similar figures in most other countries. The present tendency to reduce the length of primary and secondary education and the increasing opportunities for cultural and scientific education in the universities promise to prepare students for medical study earlier and better than ever before.

Dr. Davison (closing).—I do not feel that the average age, namely, twenty-seven years, at which physicians go into practice, should be reduced, but they should go into practice with the best training possible

SIGNIFICANCE OF SYMPTOMS IN MEDICAL TEACHING*

By RUSSELL H. OPPENHEIMER, M.D.,
Atlanta, Ga.

The justification for presenting to you these simple and commonplace ideas is found in our tendency, as teachers, to reach far out in the search for a means to our teaching goal, unintentionally overlooking simple things which are often close at hand.

Fundamental things are mostly simple, and all simple things are likely thus to be fundamental.

The phrase, "significance of symptoms," explains itself. Its fuller meaning and its relationship to medical teaching are more forcibly brought out by contrasting two questions which might be asked of ourselves or the medical student concerning any symptom presented by the patient, be it headache, backache, constipation, dizziness, or any other. These two questions are: first, "In what diseases does this symptom occur?" and second, "What is the significance of this symptom?" The answer to the first question consists of a list of diseases which the student recites more or less mechanically, or, sad as it may seem, by the use of some catch phrase or sentence of whose words the initial letters form the initial letters of the possible diseases. This answer is thus a mere memory product. To complete the diagnosis he has only to find sufficient further symptoms to form the triad, tetrad, or syndrome of one of these possible diseases.

The second question, "What is the significance of this symptom?" produces an entirely different reaction. This question he cannot answer from memory. Its answer is an expression of the thought which arises in him as a result of the exhibition of that symptom. The initial thought is followed at once by an inquiry into the functional or structural disturbance which is responsible unless, of course, that thought is itself such an inquiry. In a single sentence, we might say that, when confronted with a symptom, the student thoughtfully considers its meaning and the functional or structural changes which underlie it.

To illustrate, let us consider chronic diarrhea. Textbooks of differential diagnosis list from forty to fifty diseases of which diarrhea is a symptom. Who would care to memorize them? They need not be enumerated here. But what of the significance of the symptom? Simply speaking, it is evidence of an increased peristaltic activity of the intestine as a whole or in part. How natural, then, to wonder why there is an increased peristaltic activity and to decide that it must arise in a disturbance of the function or structure of the intestine. We may complete the illustration by considering, in part, these disturbances.

The structure of the intestine may deviate from the normal as a result of:

*Read in Section on Medical Education, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

(1) Developmental or trophic defects, such as diverticula.

(2) The action of microscopic organisms, notably *Entameba histolytica, Bacillus dysentericus, Bacillus tuberculosis, Spirocheta pallida.*

(3) Neoplastic growth.

Functional disturbances arise from factors altering motor, sensory, or secretory activity. Here the most frequent causative agent is, of course, a gastro-intestinal content of an irritating character. This is observed in fermentative and putrefactive states; in the exhibition of poisonous substances; in the presence of fecal masses and foreign bodies; in altered states of the succus gastricus and entericus. Again, functional disturbance may arise from purely mechanical factors which affect only the contour or mobility of the gut. Of this, examples are to be seen in adjacent tumors and constricting bands.

Finally, as with every symptom, we must look into the elements which go to make up the personal life of the individual: habits, occupation, thoughts, emotional stresses, family and environmental situations, fortunes and misfortunes, and all those things, both big and little, which, through their effect upon either the physical or mental well-being, are reflected in functional disturbance.

Most symptoms have a similar thoughtful significance. Shortness of breath signifies a disturbance of the oxygen tension, or the carbon dioxide tension of the blood, or both. The maintenance of their proper balance depends upon adequate ventilation of the lung, blood capable of admitting the exchange of these gases, and a suitable circulation to the pulmonary tissue. If mention of breathlessness stimulates such a response in the student's mind, he will undoubtedly proceed to the establishment of a diagnosis by the investigation of the factors concerned and maintained in preserving the oxygen and the carbon dioxide tension. Far too many patients whose breathlessness is part of a general malnutrition and weakness or other extra cardiac disturbance are sentenced to the life of a cardiac cripple because this symptom has succeeded in arousing only the response of "heart disease."

Ask the student of what he thinks when the symptom albuminuria is mentioned. Does he answer that he thinks of the presence of serum albumin and globulin in the urine and wonders why they are there? Or does he say that he thinks of a test tube filled with urine which becomes cloudy upon boiling? Or does he answer with the single word, "Nephritis?" His answer will indicate whether the symptom has a significance for him, whether it brings to mind a definite concept, or whether it remains a loose, ill-formed, uncompleted idea which he needs but join to other similar ideas to form a diagnosis.

The words of any language serve but to convey a thought and have no value in themselves. In a like manner, symptoms (which are words of the medical language) must convey a purposeful thought, a significance, which will lead to their interpretation in terms of functional and structural disturbance.

We face a hopeless task if we attempt to endow the student with all the factual, all the theoretical, and all the empirical information of medical science. We can hope only to give him the mental equipment and the ability with which to think: to think of the separate tissues of the human body, not only as such, but as a part of the patient as a whole; to think of the individual patient, not only as an individual, but as a part of society as a whole. As a part of his equipment we help him to find for symptoms a significance which will make of them expressions of disturbance of structure or of function.

DISCUSSION (*Abstract*)

Dr. L. J. Moorman, Oklahoma City, Okla.—As Dr. Oppenheimer stated, he has discussed a trite subject, which, however, deserves discussion. I think if we were to investigate the custom of young physicians who go out to do general work, we should find that many of them are neglecting to ascertain the various symptoms which are presented in the cases which come before them, because they have not been sufficiently impressed while in school with the importance of sitting down face to face with the patient and asking questions and recording the answers. In other words, many physicians fail to get the most out of medicine because they do not take written histories. History taking is the best way to ascertain symptoms and to start that interesting process of diagnosis, which really is the one thing that keeps physicians young in the practice of medicine.

Dr. J. H. Musser, New Orleans, La.—I think what Dr. Oppenheimer has said is perfectly true. If you can teach the student to investigate the cause of symptoms you are giving him a very much more practical background and something which is very much more likely to lead to thoughtful diagnosis than if you give him merely the symptoms and then let him memorize the list of causes that produce these symptoms.

Dr. Oppenheimer (closing).—Not only students but also physicians sometimes use symptoms without any definite conception of what they mean, and for this reason the symptoms can be of no particular value in diagnosis. We have a reflection of the same thing on the side of therapeutics, a great deal of our therapeusis being without definite thought.

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EUGENIA B. DABNEY, M.S., Assistant Editor
C. P. LORANZ, Secretary-Manager

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
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TRENDS IN MEDICINE

Every thoughtful physician in every line of medical work may well pause frequently these days and meditate upon the changing trends of medicine. It is necessary that he free himself, so far as possible, from the traditions of the past, the local customs of his area, and the limitations with which his professional habit of mind has subjected him by its routine. It is easy to see an evolution that has nearly ended. It is difficult to see an evolution in its beginning or before its direction is well established. The mail order house and the chain store were but small clouds on the commercial sky twenty years ago. Today the chain store is on Main Street. Indeed, Main Street is chiefly chain stores. Industries that did not follow the trend, that did not shift their line and their specialty and their approach to the public, have faded and become only faint memories. The machine and mass production have replaced the lonely plodding workman.

And so it is today with medicine. And it little avails one to speak of his rights, or his beliefs or his habits of thought and action. None of these things availed the manufacturer anything when Henry Ford came on the scene.

Medical expenses must writhe and complain among a people, however rich beyond all other peoples, who make and spend fast and easily. What resources has a family which knows not the meaning of a budget, which visualizes sickness as an emotional emergency, and whose income beyond necessities is promised months ahead on installment buying? No wonder a wise clinician said that he had rather practice medicine in this generation than to have practised it in the last or to have to practise it in the next. It is because the last generation lacked the scientific prowess and clinical precision as well as the therapeutic weapons of the present; and the next generation will be beset with profound social and economic changes that will uproot the traditions of the past and the customs of the present.

Horace used the word "mores" to express the feelings, habits, beliefs and worships of the Romans. The medical mores are changing. What is ethics now, in one city, is grievance in another. And only the years will tell the tale and only time will give the answer. John Stuart Mill, in the opening page of his famous autobiography, writes: "In an age of transition of opinions there may be somewhat both of interest and of benefit in noting the successive phases of any mind which was always pressing forward, equally ready to learn and to unlearn either from its own thoughts or from those of others." Medicine will always be safe and certain of its faith, worth and service if it possess a "mind always pressing forward" and "equally ready to learn and to unlearn from itself and from others." The open mind is a necessity.

Never before have matters pertaining to the costs of medical care been so carefully studied and discussed. Dr. M. L. Harris, at the Portland Session of the American Medical Association, and again at the Detroit Session, suggested that "component county medical societies should incorporate and establish medical centers owned, controlled and managed by the members of these societies, where all classes of persons who are unable to pay regular fees can be given the highest type of medical treatment at prices within their means." At the Detroit Session, too, the House of Delegates authorized the Board of Trustees to establish a Bureau of Medical Economics, whose function shall be to study all economic matters affecting the medical profession.

The Committee on the Cost of Medical Care has been studying these problems for three

years,[1] and at the last meeting adopted certain principles that were voiced by Chairman Ray Lyman Wilbur and then studied and approved by the General Committee. These are three:

(1) The personal relation between physician and patient must be preserved in any effective system of medical service.

(2) The concept of medical service of the community should include a systematic and intensive use of preventive measures in private practice and effective support of preventive measures in public health work.

(3) The medical service of a community should include the necessary facilities for adequate diagnosis and treatment.

The reports and studies of this Committee are well worth reading. They give to the physician a perspective of the profession and of the vast work and problems of medicine of a national and impersonal aspect, rather than a local and personal one. The study of Shelby County, Indiana, the Endicott Johnson Study, and the study of the medical and dental habits and expenses of 11,000 American families, give information and afford contrasts little dreamed of in the past. The new policy of the Government in regard to the medical care of those engaged in the Great War affords not only a medical and economic study, but an illustration of changing social trends. The private soldier may take out insurance; he has already received a bonus; now he may have medical attention and nursing, whether his disability was incurred in line of duty during the War or not; and then, in addition, he receives monthly compensation. Everywhere the Veterans' Hospitals are being enlarged to handle this vast and increasing medical burden. The Government is engaging in the practice of medicine apparently on an ever-increasing scale. These are but a few of the many economic trends.

But there are still deeper trends that are so new as to have only names and not interpretations. Among them are the many medical societies. One physician hardly knows which to attend and from which to absent himself. The journals come with increasing numbers. The demands upon the editors for space increase. The schools are accenting more and more obstetrics, and giving it 650 hours as compared with 680 hours for surgery. The tremendous growth of the specialties of orthopedics and of nose and throat work and of neurological surgery are significant.

1. Editorial. Cost of Medical Care. S. M. J., 23:275, Mar., 1930.

The accent on the mind and the personality of the patient, on functional upsets as above gross pathology in many cases is interesting. The mechanical age seems to be passing with the added importance of psychology and sociology in the life of the single patient. The gynecology that has an operation for every diagnosis is gone. Young men more and more graduate, serve their internship, and enter a specialty without any general practice. One graduating class had forty-four specialists and one general practitioner.

The lack of cultural reading by the average physician is arousing comment. The spirit of the "Harvard Classics" is not common in the profession. These are trends, and changing trends at that. And yet the sum total is for the better, and for a wiser and better medicine. There are better physicians, and patients receive better service. Ultimately, every change is an effort at progress.

THE NORMAL BLOOD PRESSURE

The blood sugar, calcium, non-protein nitrogen, hydrogen-ion concentration and other routinely measurable substances, have rather narrow limits of normal. Their amount in the blood stream changes very little in health. The arterial tension is held, as Fishberg[1] has pointed out, at not nearly so fixed a level, and considerable variation of blood pressure is observed in persons who are able to carry on the day's work. Although hypertension is usually feared, it is to some extent expected with advancing years, and the formula, "your age plus one hundred," is commonly used for normal blood pressure computation.

Alvarez[2] objects to the acceptance of this scale, and offers some evidence to refute the belief that a rising blood pressure is normal with advancing years. The figures for normals were established, he says, from statistics of insurance applicants and from college freshmen, both selected groups of individuals. He has made a contrasting study of the blood pressures of 6,000 prisoners, which sounds like another highly selected group, but which at least has a different basis of selection from that of the older statistics. He, himself, believes the prisoners to represent more fairly a cross section of the population, for

1. Fishberg, A. M.: Hypertension and Nephritis. Philadelphia: Lea and Febiger, 1930.
2. Alvarez, W. C.: Blood Pressure in 6,000 Prisoners and 400 Prison Guards. Arch. Int. Med., 46:17, July, 1930.

this one study, since their bodily measurements do not differ from those of other groups of men.[2]

Among the prisoners examined, 3,677 were of normal weight; 1,200 were 11 per cent or more overweight; and 487 were 11 per cent or more underweight. There was some variation of blood pressure with age. A few showed hypertension in early and middle life. Most of the prisoners reached middle life or old age with pressures which were no greater than they probably had in their youth. The blood pressure level for the group does not rise till after the age of 45. There should be a steady rise if there were a normal increase with age, but it actually tends to decrease during the third decade of life. The per cent of men with a pressure over 140 millimeters remains the same from the ages of fifteen to forty-five. It should rise if there were many accessions to the ranks of hypertension.

Of 58 prisoners, aged sixty to eighty-four, of normal weight, 64 per cent had a blood pressure lower than 139. Fatness and leanness had a definite effect on the blood pressure. Fatness in women began to increase the pressure in the third decade, while leanness did not lower it until the fourth.

Among Alvarez's general observations on the group were those as to race: that blood pressure in Mexicans did not rise with age; and in negroes it rose more rapidly than in white Americans.

The pressures of alcoholics and syphilitics were no higher than the others of the group. Drugs, including tobacco, seemed to raise the pressure slightly. No justification was found for the belief in the relation of blood pressure to body build, aside from obesity. The stocky man was no more liable to hypertension than the asthenic. Cool weather, however, raised the blood pressure.

The arterial tension is not raised by dissipation, drugs, or syphilis, but by heredity, excitement, the day's work, body fat and temperature. The lower limit of normal pressure is about 90 millimeters, and the upper about 140. The average pressure of the prisoners was 115.

He concludes that the level of arterial tension in most persons does not rise, even in old age, but that many who had hypertension in the fifth decade had it in the second. A pressure of 115 millimeters is just as normal, and a pressure of 140 millimeters just as abnormal, in an old man as in a young.

DIABETIC KETOSIS WITH AND WITHOUT INSULIN

Ketosis is a sign of insufficient carbohydrate combustion which may occur in various metabolic disorders, for example in nutritional diseases of infancy. It is a common sign of a severe stage of diabetes, a precursor of coma, and was, in pre-insulin days, usually fatal. Coburn,[1] of New York City, reports a comparison of two groups of diabetics, both of which had symptoms of ketosis with a carbon dioxide combining power in the blood of less than 25 volumes per cent. One group, consisting of thirty patients, was treated before 1923, and among these patients there were only two recoveries. In the second group of 92, treated since 1923 with insulin, there were 27 fatalities.

This is an enormous increase in the percentage of recoveries under insulin treatment, yet there is still nearly a 30 per cent mortality for diabetic ketosis; which indicates the seriousness of the diabetic state, even under specific treatment. What influences the life expectation of a patient with ketosis?

The age of the patient, the duration of the ketosis, and the kidney efficiency, Coburn says, are the most important factors in the prognosis of the condition. If the ketones of the blood rise without a corresponding increase in their urinary excretion, the prognosis is bad. Disturbances of kidney function are frequent in ketosis, and are often associated with falling blood pressure. Renal insufficiency as shown by failure to excrete acetone bodies is a deciding factor in the outcome. If the acidosis is relieved by continued excretion of ketones in the urine, the course is more favorable. The development of anuria, on the contrary, greatly jeopardizes recovery. Intravenous injection of large quantities of fluid is one of the most important steps in treatment, since fluids promote excretion of the ketones through the urine.

Others[2] have reported a larger per cent of recoveries than Coburn. In spite of the intensive use of insulin in the past seven years, however, there have been many strictly diabetic deaths.

1. Coburn, A. F.: Diabetic Ketosis and Functional Renal Insufficiency. Amer. Jour. Med. Sci., 180:180, Aug., 1930.
2. Lemann, I. I.: Futility of Alkali Therapy in Diabetic Coma. Analysis of 47 Cases. Ibid., p. 266.

Louisville—Where We Meet

LOUISVILLE: THE MEDICAL CENTER*

The tang of visiting new places, the refreshing stimulation of inspecting different methods of doing familiar things, the added pleasure attached to relaxation enjoyed amid strange surroundings are among the experiences awaiting those who attend the convention at Louisville in November. All the facilities possessed by Louisville; both those of a professional nature and those provided for recreation will be available to the Southern Medical Association.

HEALTH DEPARTMENT

Louisville's Department of Public Health, under C. H. Harris, M.D., will be of interest to many attending the convention. Dr. Harris extends a cordial invitation to all interested to inspect his organization and methods. Within the past year Louisville has changed from the old form of government administered by a mayor, a board of aldermen and a board of councilmen to a more efficient system of a mayor with a cabinet of six directors who are directly responsible to him and in complete charge of the departments headed by them. Whereas, the old system tended to a bureaucratic condition, the new form assures the placing of the responsibility for efficient action directly upon the head. The Department of Health, under the old system, was a branch of the Board of Public Safety, but now it is an integral part of the governmental set up. It is now known as the Department of Public Health and its Director is one of the six members of the Mayor's Cabinet. To the Department of Public Health the administration of the following institutions are entrusted: Meat and Live Stock Inspection, City Hospital, Tuberculosis Hospital, Eruptive Hospital, Laboratories and Clinics, Psychiatric Clinic, Plumbing Inspection and the Board of Examiners of Plumbers. Dr. Harris is enthusiastic concerning the operation of the Department of Public Health under this system and will be glad to go into the details of its administration for those interested.

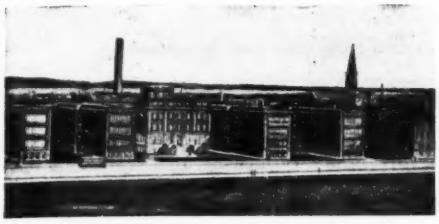
An innovation by Louisville's Health Department so far as metropolitan centers are concerned is known as the Blood Donors Squad. It is a volunteer organization of physically and mentally fit men for the purpose of giving blood for emergencies requiring transfusions. It is made up of men principally recruited from the Fire Department because of their availability. A member of the squad is given the most strict examination before being accepted and is at all times obligated to report any disability of his own or his family's. The members are classified according to the Moss classification and are obligated to submit to transfusions regardless of whether there is to be compensation or not. All hospitals in the city have a duplicate to the master file maintained in the offices of the Director of Public Health so that in the event of emergency, quick response may be obtained. No donor is used twice within a six-week period. The Blood Donors Squad was organized approximately two years ago with 16 men and it has proved itself so valuable that it has been necessary to recruit the squad up to 68 men at the present time. More than 200 transfusions have been performed with the assistance of squad members. The members of this squad are privileged to wear a gold button bearing the inscription "City of Louisville. Blood Donor. Health Department."

Other ramifications of the Health Department which will be interesting to visitors include the files maintained on all industrial plants, boarding houses and boarding homes for children. Every factor affecting health is periodically inspected and corrections are ordered where needed. Some time ago Louisville passed an ordinance putting under control of the Health Department any home boarding children and now a license is required from the Health Department before children may be boarded. The mental, physical and moral conditions of a home are inspected before such a license is issued.

SCHOOL OF MEDICINE OF THE UNIVERSITY OF LOUISVILLE

Then, too, at Louisville there is the University of Louisville School of Medicine which will attract many visitors. No doubt many of those who will attend the Southern Medical Convention will be returning to their Alma Mater. For almost a century Louisville has been the city in which many of the physicians and surgeons of the country received their training and education. The University of Louisville numbers some of the most illustrious names in the medical profession among its graduates. The School of Medicine was opened in 1837, the same year that the University of Louisville was founded by decree of the City Council. In 1847, it was

*Prepared by the Louisville Convention and Publicity League, Harry G. Evans, Secretary and Managing Director.



Louisville City Hospital

chartered as a municipal university. In 1908 a coalition of the schools of medicine of Louisville with the University of Louisville was effected, embracing the School of Medicine of the University of Louisville, the Kentucky School of Medicine, organized in 1850, the Louisville Medical College, organized in 1869, the Hospital College of Medicine, organized in 1873 and the Medical Department of the Kentucky University (now Transylvania College), organized in 1898.

In 1922, an agreement was made between the Louisville City Hospital and the University, whereby the business side of the hospital is placed under the direction of a business manager directly responsible to the Director of Health of the City of Louisville and the professional side of the hospital is placed under the direction of the School of Medicine. The School of Medicine is a member of the Association of American Medical Colleges and has received the classification of "A-1." The institution will hold much of interest to those attending the convention. It will be a supplementary attraction, which ordinarily would make the trip to Louisville well worth while.

HOSPITALS

Louisville hospitals will come in for the usual inspections accorded such places in the convention city. Without reservation, they all welcome the Southern Medical Association and promise the utmost cooperation to the end that the convention will be enjoyable and successful.

Louisville has twelve hospitals, one for tuberculosis and eleven general hospitals, of which nine admit white patients only, two serving both white and colored. There is one hospital for colored only. In addition to this, one hospital treating crippled white children, has made special arrangements for giving the same sort of treatment to colored children.

LOUISVILLE HOSPITALS

	Number of Beds
Public Institutions:	
Louisville City Hospital (White and Colored)	460
Waverly Hill Sanatorium (White and Colored) (Maintained by City and County)	210
Voluntary Institutions:	
Baptist Hospital	150
Children's Free Hospital	72
Deaconess Hospital	90
Jewish Hospital	100
Kosair Crippled Children's Hospital	63
Norton Memorial Infirmary	110
Red Cross Sanitarium (Colored)	60
Saint Anthony's Hospital	125
Saint Joseph's Infirmary	300
Sts. Mary and Elizabeth Hospital	140

But to enumerate all the professional agencies consolidating their efforts to make the convention enjoyable would require page after page of space. Suffice it to say that every facility will be available to Louisville's guests.

For leisure moments there are plenty of opportunities in Louisville to relax and make the trip a combined convention and vacation journey. Theaters, restaurants, dance halls, parks and for those so inclined some of the liveliest night clubs to be found anywhere are available.

PARKS

By the time of the convention autumn will have colored the foliage in Kentucky in the inimitable style of the Bluegrass State. The scenic attractions will be enhanced by the vivid coloring and the parks will present a gorgeous array. More than 2,100 acres of parks, with an excess of thirty-five miles of park boulevards, hold forth the promise of many pleasant afternoons. There is rugged Iroquois Park, with its majestic trees, its hills and valleys, presenting a picture of what the country about Louisville was like when the Indians selected this section as their favorite hunting grounds, gracing it with the beautiful name, "Kentucky," which, trans-

Club House, Audubon Country Club

lated from the Indian dialect, may mean either "The Land of Tomorrow" or "The Great Meadow." Other parks present landscaped vistas, riverside scenery and all types of country.

Then for the golfer there are many courses to choose from. A list of the clubs and municipal links will be sufficient to indicate the variety of courses to choose from.

Course	Holes	Yards
Audubon Country Club	18	6,261
Louisville Country Club	18	6,340
Standard Country Club	9	3,100
Crescent Hill (Municipal)	9	2,273
Cherokee Park (Municipal)	18	5,023
Shawnee Park (Municipal)	18	6,123
Big Springs Country Club	18	6,252
Producer's Wood Products	9	2,850
Mapother Course	9	2,910
Standard Oil Course	9	2,700
Green Fields (Public Country Club, Meals, etc.)	18	6,300
Owl Creek Country Club	9	3,052
New Albany Country Club (Across Ohio River)	9	3,000
Jeffersonville Country Club (Across Ohio River) (Public)	18	6,000

All courses have grass greens and arrangements may be made in Louisville to play on any of them.

More specific details of the professional and recreational facilities in Louisville which will be available for the use and enjoyment of the Southern Medical Association, will be given later and, also, at Louisville; but the foregoing material is sufficient to indicate that much of interest awaits those attending the convention and also that every agency in the Metropolis of the Bluegrass State is interested in assuring an enjoyable stay in the 1930 convention city.

LOUISVILLE HOTELS

BROWN HOTEL (General Hotel Headquarters)
Fourth and Broadway
Single room with bath, $3.00-$7.00
Double room with bath, $5.00-$9.00

SEELBACH HOTEL
Fourth and Walnut Streets
Single room with bath, $3.00-$7.00
Single room without bath, $2.50-$3.00
Double room with bath, $5.00-$9.00
Double room without bath, $4.00-$4.50

KENTUCKY HOTEL
Fifth and Walnut Streets
Single room with bath, $3.00-$7.00
Double room with bath, $5.00-$9.00
Double room with bath, twin beds, $6.00-$10.00

HENRY WATTERSON HOTEL
Walnut Street near Fourth
Single room with bath, $2.50-$5.00
Single room without bath, $2.00
Double room with bath, $4.50-$6.00

TYLER HOTEL
Third and Jefferson Streets
Single room with bath, $2.50-$5.00
Double room with bath, $4.00-$8.00

HENRY CLAY HOTEL
Third and Chestnut Streets
Single room with bath, $2.50 up
Single room without bath, $2.00
Double room with bath, $4.00 up
Double room without bath, $3.50

KOSAIR HOTEL
220 East Broadway
Single room with bath, $2.50-$3.50
Single room without bath, $1.50
Double room with bath, $4.00-$6.00

PLAZA HOTEL
409-417 South Fifth Street
Single room with bath, $2.00-$3.50
Single room without bath, $1.50
Double room with bath, $3.50-$5.00
Double room without bath, $2.00-$3.50

KENTON HOTEL
Walnut Street near Fourth
Single room with bath, $2.00-$2.50
Single room without bath, $1.50-$2.00
Double room with bath, $3.00-$4.00
Double room without bath, $2.00-$2.50

CORTLANDT HOTEL
942 South Fourth Street (Apartment Hotel)
Single room with bath, $2.50 up
Single room without bath, $1.50
Double room with bath, $4.00 up
Double room without bath, $2.50

ARGONNE HOTEL
First and Chestnut Streets
Single room with bath, $2.00
Single room without bath, $1.50
Double room with bath, $4.00

LOUISVILLE HOTEL
Sixth and Main Streets
Single room with bath, $2.00 up
Single room without bath, $1.50-$2.50
Double room with bath, $4.00 up
Double room without bath, $2.00-$4.00

VICTORIA HOTEL
Tenth and Broadway
Single room with bath, $2.00-$2.50
Single room without bath, $1.50
Double room with bath, $4.00
Double room without bath, $3.00

HERMITAGE HOTEL
543-545 South Fifth Street
Single room with bath, $2.00 up
Single room without bath, $1.50 up
Double room with bath, $3.00 up
Double room without bath, $2.50 up

BERKELEY HOTEL
664 South Fourth Street
Single room with bath, $2.00-$3.50
Single room without bath, $1.50
Double room with bath, $3.50
Double room without bath, $2.50

CHESTERFIELD APARTMENTS
Fifth and Broadway (men only)
Single room with bath, $2.00
Single room without bath, $1.50
Double room with bath, $3.00
Double room without bath, $2.00

Book Reviews

Allergic Diseases, Their Diagnosis and Treatment. By Ray M. Balyeat, M.A., M.D., F.A.C.P., Lecturer on Allergic Diseases in the University of Oklahoma Medical School. Third Edition, Revised and Enlarged. 395 pages, with 87 engravings, 4 in colors. Philadelphia: F. A. Davis Company, 1930. Cloth, $5.00.

While Dr. Balyeat's book contains nothing new to the trained allergist, it can be recommended to any physician who wishes to acquaint himself with the present day ideas in this field. It summarizes the subject and weighs disputed questions well.

It is free of typographical errors and its statements are those accepted by the most up-to-date workers in this comparatively new specialty. It will be of help to the man doing only a small amount of this work who wishes a ready reference work.

Physiology and Biochemistry in Modern Medicine. By J. J. R. Macleod, M.B., LL.D., D.Sc., F.R.S., Regius Professor of Physiology in the University of Aberdeen, Scotland; Formerly Professor of Physiology in the University of Toronto, Canada, and in the Western Reserve University, Cleveland, Ohio. Assisted by Roy G. Pearce, A. C. Redfield, N. B. Taylor, and J. M. D. Olmsted and by others. Sixth Edition. 1074 pages with 295 illustrations, including 9 plates in colors. St. Louis: The C. V. Mosby Company, 1930. Cloth, $11.00.

In this sixth edition, the general plan of the book has not been altered. The author adopts the physiochemical approach to physiology and points out the application of physiological knowledge to the understanding of disease. The book remains one of the best of all text-books of physiology. The style is very readable. The section on metabolism is especially valuable as it is in this field that the author has done important original work. The author does not attempt to discourse upon clinical medicine in detail, but makes a successful effort to point out the principles of physiology in disease. The book is almost essential for the student and the internist and should be of great value to any specialist who desires to build his medical knowledge upon the rock of fundamental science rather than on the sands of pure empiricism.

The Eye, Ear, Nose and Throat. A Volume of The Practical Medicine Series. Edited by Charles P. Small, M.D., Albert H. Andrews, M.D., and George E. Shambaugh, M.D. Series 1929. 574 pages. Chicago: The Year Book Publishers. Cloth, $2.50.

The section on eye contains good material. There are several articles on fundus examination in relation to general medicine. Maitland Ramsay offers excellent guidance in the treatment of ophthalmic emergencies. The portion of traumatic ophthalmology has many fruitful ideas. B. M. Belk has devised a simple method for exposing malingerers who claim unilateral deafness. T. German reports the bacteriology in 28 cases of mastoiditis following packing of the nose. Barbituric compounds are being used by M. R. Guttman for the prevention of cocaine poisoning in throat work. Mouth infection in relation to systemic disease is discussed by J. H. Musser. The advance of the eye, ear, nose and throat profession is chronicled in this book, and the trend of both diagnosis and treatment is shown.

Chemical Methods in Clinical Medicine. By G. A. Harrison, B.A., M.D., B.Ch. (Cantab.), M.R.C.S. (Eng.), L. R. C. P. (Lond.), Reader in Chemical Pathology in the University of London; Reader and Lecturer on Chemical Pathology in St. Bartholomew's Medical College; Chemical Pathologist to St. Bartholomew's Hospital. 534 pages, with 2 color plates and 63 illustrations. New York: The Macmillan Company, 1930. Cloth, $5.25.

The author covers the field of chemical pathology adequately. The methods given are simple and practical. Beginning with urine the various important chemical tests for blood, milk, gastric contents, duodenal contents and feces are described. There is also a discussion of basal metabolism. This should be a good book for the general practitioner.

The Bacteriophage and Its Clinical Applications. By F. D'Herelle, Professor of Bacteriology, Yale University School of Medicine. Translated by George H. Smith, Professor of Immunology, Yale University School of Medicine. 252 pages. Springfield, Illinois: Charles C. Thomas. Cloth, $4.00.

The studies of D'Herelle upon the bacteriophage, which were originally very fine, and which won for him an international reputation, have been marred by his extravagant claims for its clinical application. He quotes statistics which allege "marvelous" curative effects following its use. For example, one thousand cases of bacillary dysentery were treated with bacteriophage with only two failures. Evidence to the contrary is omitted.

His theory that acute disease is caused by ultra-pure bacteria, and chronic conditions by symbiosis between bacteriophage and bacteria, is of speculative interest.

This is the work of an advocate, not a judge.

Report on Fifth International Congress of Military Medicine and Pharmacy, London, England, May, 1929. By Commander William Seaman Bainbridge, M.C.F., United States Naval Reserve. 154 pages. Menasha, Wisconsin: George Banta Publishing Company.

This report of the Biennial Congress covers the following subjects, "Evacuation of the Sick by Air and Water," "Tropical Fevers of Short Duration," "Injuries to the Blood Vessels and Remote Sequelae of Vascular Injury," "Analysis of Glass and Rubber," and "The Teeth and Physical Fitness."

It is felt that the aeroplane offers a very excellent means of evacuating the severely ill and wounded from remote districts.

Tropical fevers of short duration which were discussed are: yellow fever, Wiel's disease, Febris hebdomadi, African epidemic ictergenic spirochetosis, hemoglobinuric fever, spirochetosis febrilis, pappataci fever, dengue and a dengue group. The causative agent, symptoms, prophylaxis and treatment are given for each.

Injuries to the blood vessels are divided into (a) lateral, (b) transverse perforations, and (c) complete severence. Methods of treating each are shown. Recent aneurysms are usually ligated.

The methods of testing rubber and glass goods are fully explained.

While this book will prove more interesting to the military man, much of it is applicable to civilian life.

Manual of the Diseases of the Eye. By Charles H. May, M.D., Director and Visiting Surgeon, Eye Service, Bellevue Hospital, New York, 1916 to 1926. 461 pages with 374 illustrations, including 23 plates and 73 colored figures. New York: William Wood & Co., 1930. Cloth, $4.00.

This internationally popular manual has now reached its thirteenth American edition. It has also been translated into French, Spanish, Italian, Dutch, German, Japanese and Chinese. Whole chapters have been rewritten in this edition. A few new illustrations and some additions have been incorporated into the text. The slit lamp and corneal microscope which have become of proven value in clinical examination, are fully described. The latest accepted advances in therapeutics and operations such as Gonin's operation for the detachment of the retina, iridostasis and peripheral iridectomy are found in this volume. Its completeness and thoroughness make it a necessity.

A Text-Book for Midwives. By John S. Fairbairn, M.A., B.M., B.Ch. (Oxon.), F.R.C.P. (Lond.), F.R.C.S. (Eng.), Mast. Midw. Soc. Apoth. (Lond.), Consulting Obstetric Physician, St. Thomas' Hospital and General Lying-In Hospital, York Road. Fifth Edition. 369 pages, with 119 illustrations, 5 in color, and 3 plates. New York: Oxford University Press. Cloth, $8.00.

The author begins his book with a brief, elementary sketch of the anatomy and physiology of the entire body, with later a detailed description of the female generative tract. In order more fully to acquaint the prospective mid-wife with the value of antisepsis, several pages are given over to a concept of the germ theory. A great deal of attention is devoted to the physiological changes that occur in the female during pregnancy and to the diagnostic signs, both of pregnancy and those premonitory to complications. Under the heading of labor, the author gives the method of examination, the mechanism involved and the management of normal labor. It is interesting to note that most patients are shown being delivered on their right side. Besides the customary presentations the writer includes twin pregnancy, prolonged labor, contacted pelvis, prolapse of the fundus, hemorrhage and eclampsia as abnormal labor. In these conditions the text is, for the most part, limited to diagnostic criteria, and first-aid measures, as the mid-wife must call the physician in for these cases. The author recommends intrauterine douche as a part of the treatment for secondary post-partum hemorrhage, which is rather frowned upon in most places. As medical advice is necessary in complications of the puerperium, that portion is rather meager.

Under the heading, "The Infant," there is included a chapter on the normal development, disturbances, feeding of the normal child, management of the premature and diseases of the newborn. The milk is diluted to certain percentages and lime water is added.

Operative measures such as forceps delivery and cesarean section are relegated to a minor place as the mid-wife is not concerned with these. Excerpts from the Central Mid-Wives Board are quoted throughout the volume. This book will compare favorably with the nursing text-books of this country, the practical side being stressed, rather than the theoretical.

The International Medical Annual. A year book of treatment and practitioner's index. Edited by Carey F. Coombs, M.D., F.R.C.P., and A. Rendle Short, M.D., B.S., B.Sc., F.R.C.S., with 34 contributors. 598 pages, 59 plates and 54 illustrations. New York: William Wood & Co., 1930. Cloth, $6.00.

The present volume is the forty-eighth edition of this book and its appearance is welcomed each year by those familiar with this publication. The contributors are outstanding physicians in Great Britain. The volume is international in character. However, no preference is given in the text to the work of British authors. Every article abstracted contains its reference. For any one who wishes to familiarize himself with the advances which have been made in medicine during the year, the book is of great value. The specialist, by means of it, can keep posted on the progress made in all phases of medicine with a small output of time.

Most books of this type are considered too elementary for many of the profession. This one is the exception.

Alimentary Anaphylaxis (Gastro-intestinal Food Allergy). By Guy Laroche, Charles Richet Fils and Francois Saint-Girons, Paris, France. Foreword by Professor Charles Richet, of the Faculty of Medicine of Paris, Member of the Institute and of the Academy of Medicine. Translated by Mildred P. Rowe and Albert H. Rowe. 139 pages. Berkeley, California: University of California Press, 1930. Cloth, $2.00.

This translation of the French booklet on food allergy, or food sensitization, is well done. This monograph covers the history of the principle contributions to our knowledge of gastro-intestinal allergy, and also much information which is valuable to the clinician. Urticaria, eczema, angioneurotic edema, migraine, convulsions, perennial hay fever, chronic bronchitis (so-called), bronchial asthma, various symptoms such as headache, abdominal pain, vomiting, diarrhea, chronic colitis, dizziness, weakness, or mental depression may result from food allergy. This monograph, in a very short space, gives the main points of the theories, diagnosis, and treatment of cases of food allergy. It is a valuable booklet, particularly for the clinician.

Physiological Principles in Treatment. By W. Langdon Brown, M. A., M.D., Cantab., F.R.C.P., Physician to St. Bartholomew's Hospital, with the collaboration of R. Hilton, M.A., M.B., Cantab., M.R.C.P., Assistant Physician and Assistant Director of the Medical Unit St. Bartholomew's Hospital. 464 pages. New York: William Wood & Co., 1930. Cloth, $3.75.

This book links together laboratory and clinical physiology. The writer first reviews normal physiology, and then the changes that are to be seen under pathological conditions. He gives a method of treatment basing the rationale of it on the conditions that he has just described. In this edition the section on diabetes has been revised. Insulin is discussed under a separate heading. The Minot-Murphy treatment of pernicious anemia has been added as well as new work on ovarian hormones. The physiology of the parathyroids, vitamins, and the treatment of Graves' disease have received special attention. While there are many points of treatment with which the average practitioner may not agree, he will find some new ideas and good material.

Medical and Surgical Year-Book. Physicians' Hospital of Plattsburgh, comprising Wednesday afternoon invitation lectures, papers of the cardiac round table, the first Beaumont lecture, collected papers of the staff. 322 pages. Plattsburgh, N. Y.: The William H. Miner Foundation, 1930.

This is a rather worthy and ambitious effort of the staff of this hospital. Five students enrolled for the course in cardio-nephritis and arterial hypertension. A cardiac round table was held for two days. This volume includes the proceedings of this seminar, records of cases presented, invitation lectures of invited guests, the papers of the staff for the year, and the first Beaumont lecture, which was given by Dr. Walter R. Steiner, of Connecticut. The volume is particularly well done, of good paper and the cuts and drawings are unusually good. In a volume of this kind, with many papers from different men, some are good enough to be refreshing, others theoretical to mediocre. For a first effort in a relatively unknown medical center (except for historical halo cast by the fact that Beaumont practiced at Plattsburgh and there published in 1833 his famous frontier physiological research on "Experiments and Observations on the Gastric Juice and the Physiology of Digestion"), it is in general creditable. It may, in the future, be well to enlarge the scope of the subject studied to include the heart, the circulation, and the kidney. There is a questionable tendency to accent the heart and overlook the periphery.

Floyd, on heart failure, is very good and worth reading. Paroung again writes well on congenital syphilis, but shows no familiarity with McCord's extensive work on the subject. Steiner sums Beaumont well, though more space devoted to Lawson, the surgeon-general, whose only claim to fame is his ill treatment of Beaumont, and the friendship between Robert E. Lee and Beaumont in the controversy, would have been interesting. Houghton has worked much on hypotension, but such statements as "The commonest causes of low blood pressure in ambulatory patients are focal sepsis," and so forth, are at least rather dogmatic. The pedigogic articles, those by full-time professors in the preclinical subjects, are the best in the volume. Among them may be mentioned, "The Emetic Action of Digitalis," by Dresbach; "Assay of Digitalis," by Knudson, and Robb's "Cardiac Muscle Conduction." The average clinician would enjoy most Neff on "Pneumonia in the Aged" and Wede on "Quinidine." As a whole, the papers intimate an element of strain and putting the best foot forward rather than an easy effort at teaching. There will be more confidence and less theory in the next volume, one may be sure.

Nasal Catarrh. By W. Stuart-Low, F.R.C.S. (Eng.), Consulting Surgeon to the Central London Throat, Nose and Ear Hospital. 84 pages, with illustrations. London: H. K. Lewis & Company, Ltd., 1930.

Differing from the accepted usage of the country, Stuart-Low applies the term catarrh to any nasal secretion. These may be serous, sero-mucous, muco-purulent, purulent or sanguinous. All these conditions, he feels, are due to obstruction; and removal of the obstruction, along with some further treatment, will cure all cases. However, he warns against too excessive a destruction of the nasal mucous membrane and too enthusiastic an operation. Polypi, ethmoiditis and rhinitis are also taken up. The book is simple in explanation, and is to be recommended for the younger men of the specialty.

The Diagnosis and Treatment of Variations in Blood Pressure and Nephritis. By Herman O. Mosenthal, M.D., Professor of Medicine and Attending Physician, New York Post-Graduate Medical School and Hospital, New York, N. Y. Volume VII of A. Christian, M.D., Sc.D., LL.D., Hersey Professor of the Theory and Practice of Physic, Harvard University, and Physician-in-Chief, Peter Bent Brigham Hospital, Boston, Mass. 184 pages. New York: Oxford University Press, 1930.

Years ago the elder Janeway took into his office to assist him two young men fresh from their internship. One was W. W. Herrick and the other, his friend, the author of this volume. Janeway's judgment has been vindicated by two notable careers. The opening paragraph of Chapter 1 on the "Physiologic Dynamics Controlling Arterial Pressure," is quoted from the younger Janeway. It is a rather small book with the accent on pressure as a variable dynamic function. Pressure is a function to be influenced. Chapter VII discusses the "Influence of Habits and Daily Routine Upon Blood Pressure." There are nine chapters, and the seven, in addition to the two mentioned, discuss "Normal Arterial Pressure," "Clinical Methods of Estimating Blood Pressure," "Capillary and Venous Pressure-Hypotension," "Tests for Functional Efficiency of the Circulation," "Blood Pressure as Related to Life Insurance," "Types of Increased Blood Pressure," and "Essential Hypertension." Chapters I, IV, VII, VIII and IX are for the average clinician definite and valuable. One is impressed with the brevity of the chapters and the open mindedness of the author. There is an absence of dogmatism, a proportional accent, and ample inclusions of the variables of the subject. Ample references are given.

The last chapter is on "Essential Hypertension," and the reader can well study its 51 pages. It took a lifetime of experience to write them. The table on page 144, the history form for hypertensive cases, the more frequent association of coronary disease with essential hypertension than any other disease, and the treatment, are well executed. The psychic element in treatment is well accented. Due consideration without undue flattery is given drugs, including sodium thiocyanate and mistletoe. One who fads a specific drug in his hypertensives might have his therapeutic fervor cooled correctly by reading the comments on treatment. One is somewhat surprised at the space given the Dwight-Frost cardio-respiratory test. It is certainly not commonly used by the profession. The book is the simplest, sanest and wisest discussion of blood pressure available, and that with a well chosen brevity. As a small book with much understanding, it is of great help and easily gotten at.

Physical Diagnosis. By Richard C. Cabot, M.D., Professor of Clinical Medicine in Harvard University; Formerly Chief of the West Medical Service at the Massachusetts General Hospital. Tenth Edition. 529 pages, with 279 figures in the text and 6 plates. New York: William Wood & Co., 1930. Cloth, $5.00.

So great is the knowledge and experience of Dr. Cabot, and so carefully has he written this text on physical diagnosis, that very little revision was necessary in this new edition. Some new matter relating to coronary disease, electrocardiography, cancer of the lung, "cardiac asthma," toxic hepatitis and encephalitis lethargica has been introduced. The section on laboratory methods has been brought up to date. Both student and graduate will continue to find it invaluable.

Nervous and Mental Diseases. Edited by Peter Bassoe, M.D., Clinical Professor of Neurology, Rush Medical College of the University of Chicago. A volume of The Practical Medicine Series, 1929. 440 pages, illustrated. Chicago: The Year Book Publishers. Cloth, $2.25.

It is noted that the editor gives a great deal of space to the other forms of encephalitis, in contrast to the previous editions where reports on the epidemic type predominated. Several examples are given of the disseminated type, which attacks the gray matter, following vaccination and measles. Encephalography by means of both cisternal and lumbar puncture is described in detail by Henry K. Pancoast and Temple Fay. Thus, the old operative measure is obviated. Cisternal puncture is also growing in popularity as a diagnostic measure. Fever therapy is still the method of choice in the treatment of neuro-lues. Many new methods and agents are being used to induce this reaction. As the general physician usually avoids the field of neurology, this book offers him an excellent opportunity to brush up. Numerous editorial notes make the book valuable for reference.

Mammalian Physiology. A Course of Practical Exercises. A New Edition. By E. G. T. Liddell, D.M., Fellow of Trinity College, Oxford, and Sir Charles Sherrington, O.M., M.D., D.Sc. (Cantab.), F.R.S., Waynflete Professor of Physiology in the University of Oxford. 162 pages. New York and London: Oxford University Press, 1929.

Sir Charles Sherrington, Professor of Physiology at Oxford, has invited the collaboration of his colleague, Dr. Liddell, in the preparation of this, the second edition of the book. The outstanding ingenuity and skill of Prof. Sherrington are reflected in this laboratory manual of mammalian experiments. The experiments chosen are the most interesting and instructive, and are described in fullest detail, and beautifully illustrated. The performance of these experiments will prove valuable training for technic as well as for first hand knowledge of physiology.

Notes on the Commoner Skin Diseases. By Harry M. Robinson, M.D. 124 pages, illustrated. New York: Critic and Guide Company, 1930.

For students in school this should prove a useful handbook. The numerous illustrations, although small, are excellent.

The Ready Reference Medicine and Surgery, Monograph on Malaria. By D. Drysdale Anderson, M.R.C.S., L.R.C.P., D.T.M.& H., D.P.H., (Eng.), Medical Officer of Health, West African Medical Staff. Introduction by Allen H. Bunce, A.B., M.D., F.A.C.P., Department of Medicine, Emory University School of Medicine. 228 pages, illustrated. Atlanta: S. J. Pridgen Company. Cloth, $6.00.

Most readers will probably expect exhaustive presentation of a subject in a monograph, yet the treatise under consideration undertakes to cover the subject in 139 pages, totaling about twenty-five thousand words, which is only about two and one-half times the attention paid the subject in Osler's text. The treatment is obviously not exhaustive, and actually in many phases is very superficial. If designed for the perusal of one who is acquiring his first knowledge of malaria, the initial use of the abbreviations B. T. and M. T. without explanation in referring to benign tertain and malignant tertain will prove confusing at the start. Several errors and injudicious statements are encountered in a rapid perusal, of which the following are typical: The species *P. vivax* is ascribed to Gram and Faletti. The designation of the production of gametocytes as a cycle of gametogony is incorrect. To those who have had experience in the examination of blood smears from malaria cases, the admonition quoted from Plehn that it is almost impossible on morphological grounds to distinguish a ripe tertain schizont from a gametocyte, will be a surprise. The colored illustrations have not been carefully prepared and will mislead, rather than aid the beginner. Most of the entomological illustrations are crudely drawn and are not informative. The opening sentence of the section on entomology, "The Anopheles mosquito is the true host of the malarial parasite; it consists of a head, a thorax to which are attached two wings, two halteres, and six legs; behind the thorax is the abdomen," is a half sample of the erudition displayed in the remainder of this section. In the clinical section, no reference is made to the fact that the fever of the onset in primary attacks is remittent rather than intermittent in character. The designation of splenic enlargement and anemia as sequelae is incorrect. The examination of thick blood smears is not mentioned, while Leishman's stain is the only method of coloration discussed. The recommendation of daily doses of quinine as a personal prophylactic is not judicious, nor is it in accord with the best current opinion, The section on prevention is too superficial to serve as a guide to an inexperienced person. On the whole, the work is too elementary to appeal to the specialist and not sufficiently reliable to be recommended to the practitioner or student. The form is attractive, while the book is arranged to permit both marginal notation and the insertion of new material.

The Clinical Examination of the Nervous System. By G. H. Monrad-Krohn, M.D., F.R.C.S., Professor of Medicine in the Royal Frederick University, Oslo; Physician-in-Chief to the University Clinic for Nervous Diseases, Oslo, with a foreword by T. Grainger Stewart, M.D., F.R.C.P., Physician to the National Hospital for the Paralyzed and Epileptic, Queen Square; Roehampton (Ministry of Pensions). Fifth Edition. 222 pages, illustrated. New York: Paul B. Hoeber, Inc., 1930. Cloth, $2.50.

It is surprising that such a large amount of data can be explained with such clearness in so little space as in this small book. In this new edition there has been added a short description of the technic of ventriculography and encephalography. This book can be highly recommended to aid in the establishing of a routine, for the examination of neurological patients.

It's LOUISVILLE this NOVEMBER

Louisville, "At the Crossroads of the Nation"

November 11-14, 1930

Another of those great occasions—the annual meeting of the Southern Medical Association. Here will be heard the "last word" in scientific medicine and surgery. Tuesday and Wednesday general clinical sessions, Thursday and Friday the sections, with just enough entertainment and recreational features to make a medical meeting complete. Louisville is a delightful city to visit—a medical center with a large and active medical profession. Good hotels. Reduced railroad rates for those who travel the train way. Fine roads with beautiful scenery amid historical setting for those who go the motor way. **Let's go!**

Clinical Features of Heart Disease, An Interpretation of the Mechanics of Diagnosis for Practitioners. By Leroy Crummer, M.D., Emeritus Professor of Medicine, University of Nebraska. Introduction by Emanuel Libman, M.D., Professor of Clinical Medicine, Columbia University. Second Edition. 415 pages. New York: Paul B. Hoeber, Inc., 1930. Cloth, $4.00.

This is the second edition of this important practical, clinical, monograph on heart disease. It is sound, useful and valuable because it correctly states the modern view of cardiology, based upon physiology, and not upon anatomy of the heart and blood vessels. It gives in the most direct, simple way the physiologic basis for the diagnosis, prognosis, and management of heart disease. The book will be appreciated by medical students, research workers and internists who are interested in the circulation.

Southern Medical News

ALABAMA

The Northwest Alabama Medical Association met at Berry in July. Five counties were represented.

Deaths

Dr. H. A. Milford, Fivepoints, aged 55, died April 13 of cerebral hemorrhage.

ARKANSAS

The Woman's Auxiliary of the Arkansas Medical Society elected for the coming year Mrs. C. E. Oates, Little Rock, President; Mrs. W. R. Brooksher, Jr., Fort Smith, President-Elect; Mrs. P. E. Phillips, Ashdown, Vice-President; Mrs. E. L. Beck, Texarkana, Treasurer; Mrs. W. V. Laws, Hot Springs, Parliamentarian; Mrs. C. W. Garrison, Little Rock, Historian; Mrs. J. C. Cunningham, Little Rock, and Mrs. Grayson Tarkington, Hot Springs, Directors for one year; Mrs. C. T. Drennen, Hot Springs, and Mrs. E. E. Barlow, Dermott, Directors for two years.

Deaths

Dr. Martin Johnston Barlow, North Little Rock, aged 56, died July 1.

Dr. Mark J. Ducommon, Camden, aged 35, died May 20 of suffocation due to a dental plate falling into his throat.

Dr. Stirling Price Gammil, Charleston, aged 68, died May 13 of cerebral hemorrhage.

Dr. Neal Horton, Plumerville, aged 49, died May 21, of cerebral hemorrhage.

Dr. Luther Hinton Stout, Brinkley, aged 40, died June 29.

Dr. Alex C. Northum, Charleston, aged 79, died May 13, of coronary thrombosis.

Dr. Horace F. Villars, Little Rock, aged 60, died April 24.

DISTRICT OF COLUMBIA

The George Washington University Medical Society at its annual meeting in Washington elected Dr. Wm. Thornwall Davis, President; Dr. Albert P. Tibbets, Vice-President; Dr. W. Raymond Thomas, Treasurer; Dr. Henry L. Colvin, Secretary, all of Washington.

Dr. John B. West, Washington, sailed recently for Abyssinia, where he became physician to the Emperor of Ethiopia.

Deaths

Dr. John Hamilton Stone, Washington, aged 58, died June 9, of acute myocarditis.

Dr. Harvey Washington Wiley, Washington, aged 85, died June 30, of heart disease.

FLORIDA

Dr. W. H. Watters, of Miami and Boston, Massachusetts, has been reelected President of the Massachusetts Medico-Legal Society. This Society is the oldest of its kind in the country. It is composed of official medical examiners of the state and those doctors and lawyers who are interested in medico-legal topics.

Dr. Shaler Richardson was elected to the Board of Governors of the American Medical Editors' and Authors' Association at the annual meeting of this organization held recently in Detroit, Michigan.

Dr. George E. Beckman has been appointed as Associate in the section of anesthetics of the Duval County Hospital medical staff.

Dr. C. A. Williams, of St. Petersburg, is spending the summer in New England.

Dr. Will Wood, of Pine Castle, has moved his office to Holopaw.

Dr. S. A. Clark, of Lakeland, spent several weeks

in New York doing post graduate work at the New York Lying-In Hospital and the Post-Graduate Medical School.

Dr. Louis M. Orr, Orlando, recently attended the meeting of the American Urological Society in New York.

Mrs. Frederick J. Waas, of Jacksonville, has been reelected President of the St. Vincent's Hospital Woman's Auxiliary.

Dr. G. H. Edwards, Orlando, recently attended clinics in New York City and the Kiwanis convention in Atlantic City.

Dr. C. M. Sandusky has been appointed Associate in the ear, nose and throat service of the medical staff at the Duval County Hospital.

Dr. B. C. Wilson, of Jacksonville, took post-graduate work in public health in New York recently.

Dr. J. S. McEwan, Orlando, attended his class reunion at Northwestern University and also clinics in Chicago.

Dr. John Bell, Pensacola, attended clinics in St. Louis, Missouri, this summer.

Dr. L. M. Anderson, Lake City, has been appointed Surgeon General on the staff of General Ayers, Commander of the Florida Division, United Confederate Veterans, with the rank of colonel.

Dr. Shaler Arnold Richardson and Miss Helen Hare, both of Jacksonville, were married June 26.

Dr. Joseph C. Inman, of Chattahoochee, and Miss Dorothy Driver, of Tampa, were married July 2.

Dr. Spencer Folsom, of Orlando, and Miss Mary Margaret Taylor, of Beaver, Pennsylvania, were married on June 14 at Beaver, Pennsylvania.

Deaths

Dr. George Chillcote Barton, Lakeland, aged 77, died May 17, of cerebral hemorrhage.

Dr. John William Charles Boone, Avon Park, aged 64, died in April at Tulsa, Oklahoma.

Dr. Anton J. H. Jansenius, St. Andrew, aged 81, died May 27, of cerebral hemorrhage.

GEORGIA

The Chattahoochee Valley Medical and Surgical Association elected Dr. C. W. Roberts, Atlanta, President; Dr. A. H. Hilsman, Albany, First Vice-President; Dr. Marion Davidson, Birmingham, Alabama, Second Vice-President; Dr. W. J. Love, Opelika, Alabama, Secretary-Treasurer. The Board of Council will be composed of Dr. Gilbert Douglas, Birmingham, Alabama, President; Dr. Frank Boland, Atlanta; Dr. Hugh McCullough, West Point; Dr. C. H. Richardson, Jr., Macon; Dr. Henry Green, Dothan, Alabama, retiring president. The 1931 meeting will be held at Albany.

Dr. William R. Dancy, Savannah, was elected First Vice-Commander-in-Chief of the Sons of Confederate Veterans at the reunion held recently at Biloxi, Mississippi.

Honorary degrees of Doctor of Public Health were conferred upon Dr. T. H. Johnson, Athens, and Dr. T. H. D. Griffitts, Albany, by the University of Georgia Medical Department, August, for their outstanding records as public health officials.

Dr. A. C. Shamblin has moved from Rome to Cartersville, where he will devote his entire time to public health work.

Dr. J. K. Fancher, Atlanta, spent a month in Boston, New York City and other Northern cities in post-graduate study.

Dr. Charles E. Dowman, Atlanta, now has associated with him Dr. Edgar F. Fincher, Jr., practice limited to neurological surgery.

Dr. S. H. Haddock has removed from Millen to Augusta and accepted a position on the house staff of the University Hospital there.

Dr. Murdock Equen, Atlanta, attended a meeting of the American Bronchoscopic Society at Atlantic City.

Dr. Charles E. Dowman, Atlanta, was elected President of the Society of Neurological Surgeons at a recent meeting in Washington and Baltimore. This organization is composed of about twenty-five nationally known neurological surgeons.

Dr. Cleveland Thompson, Millen, has been appointed Trustee of the Medical Department of the University of Georgia, Augusta.

Dr. J. Walter McMahan, formerly of Sevierville, Tennessee, is now located at Alma and engaged in the practice of medicine.

A week of lectures was given by Dr. Fruhwald, of Vienna, at the Academy of Medicine, Atlanta, on Treatment and Pathology of Sinuses and Plastic Surgery of the Nose.

Dr. Asa Beach, of Thomaston, and Miss Mildred Bawsel were married June 28.

Deaths

Dr. William Alexander Carlton, Athens, aged 82, died May 9 of endocarditis.

Dr. Forest P. Hudson, Tucker, aged 68, died June 6.

Dr. William M. Richardson, Iron City, aged 58, died May 31 in Pendleton, South Carolina, of nephritis.

Dr. Cornelius C. Whelchel, Comer, aged 76, died June 5.

Dr. William Sterling Wilkinson, Augusta, aged 59, died June 14.

KENTUCKY

The annual meeting of the Kentucky Medical Association will be held at Bowling Green, September 15-18.

The Good Samaritan Hospital at Lexington has received a gift of $100,000, made by an anonymous donor, which will make possible a new annex to the hospital.

Dr. R. Glenn Spurling and Dr. Franklin Jelsma, Louisville, will be associated in practice limited to neurological surgery at 402 Brown Building.

Madge G. Hamnette has been appointed Superintendent of the Children's Free Hospital, Louisville.

Dr. Charles W. White and Miss Evelyn Hassert, both of Covington, were married May 1.

Deaths

Dr. Walter S. Conn, Louisville, aged 71, died June 25, of cerebral hemorrhage.

Dr. John Valentine Hayden, Salem, aged 80, died May 14, of cerebral hemorrhage.

Dr. Henry Preston Sights, Paducah, aged 66, died May 28, of heart disease.

Dr. George W. White, Clay, aged 71, died May 21, of acute cholecystitis.

Dr. Edmond Reno Yost, Greenville, aged 53, died May 21, of diabetes mellitus.

LOUISIANA

The new marine hospital being built in New Orleans will contain 600 beds and cost $2,000,000. If the resolution passed by the Association of Commerce of New Orleans is accepted, the hospital will be called Rucker Hospital. It is believed credit for the plans for the hospital justly belongs to the late Dr. W. C. Rucker.

The American Hospital Association will meet in New Orleans October 20-24. Mr. Louis J. Bristow, Superintendent of the Southern Baptist Hospital, New Orleans, will head the committee on local arrangements for this meeting. He took over the duties as a result of the death of Dr. W. C. Rucker, who was to have welcomed the delegates.

(Continued on Page 34)

The Great *Survivor*

COD LIVER OIL may well be termed "The Great Survivor." Its therapeutic efficiency was recognized even before we knew that this was due to the vitamins A and D.

Although there has been much research work done on new products, scientific opinion agrees that there is no substitute for cod liver oil. Other vitamin preparations are all right, up to a point, but cod liver oil goes one step further. It is a combination of a highly digestible fat and both vitamins A and D. It is a nutrient that has high energy value, stimulates bone and tissue formation, and is one of the most valuable protective agents available.

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The co-operation of physicians is invited. It is the policy of the Hospital to return patients to their home and family physician for treatment, at the earliest possible moment, after diagnosis is made. Only at the request of the patient's physician will any case be kept in the Hospital beyond the necessary period of observation.

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DR. ALBERT E. STERNE or
DR. LARUE D. CARTER

"Norways" Hospital for General Diagnosis and Nervous Diseases.

(Continued from Page 868)

The National Home for Lepers, maintained by the U. S. Public Health Service at Carville, handles an average of 300 patients during the year. During the fiscal year forty-nine new patients were admitted and nineteen patients released as no longer a menace to public health.

Surgeon J. G. Wilson, of the United States Public Health Service, who has been stationed at New Orleans Quarantine Station, has been assigned to duty at Atlanta, Georgia, as Chief Medical Officer of the United States Penitentiary.

Deaths

Dr. Isaac James Newton, Monroe, aged 74, died June 5.

Dr. Merrick Edmond Saucier, Lafayette, aged 48, died June 2, of heart disease.

MARYLAND

The Garvan Cancer Research Laboratory of the Surgical Pathological Laboratory of the Johns Hopkins University, will conduct lantern slide demonstrations of the diagnosis and treatment of diseases and tumors of bone, in the ballroom of the Belvedere Hotel in Baltimore, September 15, 16 and 17. The first day will be devoted to the fundamental and essential lesions of bone; the second day to different diseases of single bones; the third day to the presentation of rare lesions of bone difficult to diagnose. Members of the medical profession are invited. Physicians may register any rare cases by addressing Miss Maude Walker, Secretary to Dr. Bloodgood, Johns Hopkins Hospital, Baltimore. X-ray films or lantern slides of the case should be included, and sections of tissue if possible. All cases registered will be sent later for diagnosis to Dr. Bowman C. Crowell, Director of Clinical Research of the American College of Surgeons, Chairman of the Bone Sarcoma Committee.

Dr. James Angus Doull, who has been at the School of Hygiene and Public Health of Johns Hopkins University School of Medicine, Baltimore, for nine years, has been appointed Professor and head of the Department of Hygiene and Public Health at Western Reserve University School of Medicine, Cleveland.

Dr. Ferdinand O. W. Reinhard has charge of the Bureau of Communicable Diseases, Baltimore City Health Department, acting as head of the Bureau until Dr. Daniel S. Hatfield recovers from the effects of an attack of psittacosis following his investigations of the outbreak of the disease in Baltimore last winter. Dr. Calvin Hyman succeeds Dr. Reinhard as Health Officer.

A new hospital has been completed at Fort George G. Meade, where several thousand men of the Regular Army, National Guard, Organized Reserve Corps, Citizens' Military Training Camps and Reserve Officers' Training Corps will receive practical field training.

Dr. Thomas B. Futcher, Baltimore, was elected President of the Association of American Physicians at its recent meeting held in Atlantic City.

Dr. Eldridge Houston Campbell, Jr., and Miss Eleanor A. Brown, both of Baltimore, were married July 2.

Dr. Edwin B. Jarrett, of Baltimore, and Miss Dorothy Duncan, of Govans, were married June 28.

Deaths

Dr. Bertha Dalrymple Berger, Annapolis, aged 70, died June 7, of cerebral hemorrhage.

MISSISSIPPI

Deaths

Dr. Lowe H. Bibby, Cascilla, aged 63, died May 19, of nephritis.

Dr. Jacob M. Curtis, Summit, aged 81, died May 23, of senility.

Dr. William S. Claitor, Ethel, aged 49, died in April.

Dr. William Howard Miller, Okolona, aged 85, died April 8.

(Continued on Page 36)

"They Are Fit for a Strenuous Year at School"

SEPTEMBER—the month in which parents bring their children to your office to be *sure* they are fit for a strenuous year at school. Whether it be kindergarten, grade, prep school, or college, you are the judge.

Your advice must be definite and complete because nothing is more vital to parents than the well being of their loved ones.

If there is the least question, you can't afford to take a chance; employ x-rays generously—parents expect it of you.

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By **Abr. L. Wolbarst, M.D.,** Urologist and Director of Urologic Clinics, Beth Israel Hospital; Consulting Urologist, Central Islip State Hospital, Manhattan State Hospital, Jewish Memorial and Madison Park Hospital, New York.

298 pages, with 140 illustrations and 7 full page color plates. 2nd Revised and Enlarged Edition. Price, silk cloth, $5.50.

THIS is a highly practical work intended for the general practitioner and the medical student. Not a pocket syllabus, but a work that will meet the need of the practitioner, giving him everything that he needs in diagnosis and treatment of gonorrhea and its complications. In this new edition most of the chapters have been revised and rewritten, either completely [illegible], and new illustrations have been added. A special feature is the series of beautiful color plates, numbering 14 separate cuts in all.

Contents.—Anatomy; Acute Gonorrhea; Diagnosis; Treatment of Acute Uncomplicated Gonorrhea; Complications of Acute Gonorrhea; Chronic Gonorrhea; Stricture of the Urethra; Chronic Posterior Gonorrhea; Chronic Prostatitis; Chronic Seminal Vesiculitis; Diathermy in Gonorrhea; Methods of Determining the Source of Pus and Shreds in Urine; When is Gonorrhea Cured? Sexual Neuroses Following Gonorrhea; Personal Prophylaxis; Gonorrhea in Male Children; Male Sterility Following Gonorrhea, etc.

British Medical Journal—"It is certain that every practitioner who reads Dr. Wolbarst's book can acquire an up-to-date and complete knowledge of the treatment of gonorrhea."

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(Continued from Page 34)

Dr. Jenner Harvey McNeill, Olive Branch, aged 46, died April 27.

Dr. James Sylvester Voyles, Corinth, aged 60, died May 20, of chronic nephritis.

MISSOURI

The Central Institute for the Deaf, St. Louis, has been granted a fund by the General Education Board of the Rockefeller Foundation of $25,000 a year for five years to be used for educational research. This will make possible the founding of a national teachers' college for the training of teachers for the deaf and defective in speech.

The City of Independence has obtained approximately $110,000 of the $125,000 sought as its share of the funds for the Independence Community Hospital. The hospital will cost $250,000, not including the equipment.

The medical and surgical staff of the Evangelical Deaconess Home and Hospital, St. Louis, which was dedicated last May, is composed of: Dr. L. H. Hempelmann, Dr. J. C. Peden, Dr. E. H. Rohlfing, Dr. Leland Alford, Dr. E. Brockelmann, Dr. Lee Dorsett, Dr. C. T. Eber, Dr. Chas. Klenk, Dr. H. G. Lund, Dr. H. L. Nietert, Dr. Francis Reder, Dr. J. F. Shoemaker, Dr. W. A. Shoemaker, Dr. A. R. Shreffler, Dr. C. H. Shutt, Dr. F. C. Simon, Dr. Charles Stone, Dr. George B. Winter, Dr. F. M. Barnes, Dr. R. H. Davis, Dr. W. C. Gayler, Dr. Harry W. Lyman, Dr. Noble D. McCormack, Dr. Hugo Reim and Dr. H. McClure Young.

Dr. R. A. Ryan, owner and director of the Ryan Hospital at Mountain Grove, opened this institution to the public several months ago. The hospital is open to all reputable practitioners of medicine.

Dr. F. M. Grogan, who was formerly connected with the Glenwood Sanatorium at St. Louis, has been appointed Superintendent of State Hospital No. 3 at Nevada. He succeeds Dr. George A. Johns, who is now Superintendent of the St. Joseph State Hospital at St. Joseph.

Dr. George E. Benninghoff, Dr. Harris A. Canfield, Bradford, and Dr. Henry F. L. McCoy, Smethport, charter members, were honored by a dinner given by the McKean County Medical Society in celebration of the fiftieth anniversary of this organization.

Dr. Russell L. Haden, Kansas City, has been appointed to the staff of the Crile Clinic at Cleveland, Ohio.

Dr. Eugene R. Van Meter, St. Louis, and Miss Helen Fribley, of Assumption, Illinois, were married June 11.

Dr. W. T. Stacy and Miss Katherine Ann McKee, of St. Joseph, were married May 17.

Deaths

Dr. Luther P. Carlyle, Chula, aged 63, died February 22.

Dr. M. L. Kullman, St. Joseph, died May 19.

Dr. Samuel A. Peake, St. Louis, aged 58, died June 24 of hemorrhage of the brain.

Dr. Delbert Leroy Wood, Kansas City, aged 50, died May 14.

NORTH CAROLINA

The new $4,000,000 hospital and medical school building at Duke University, Durham, was opened in July. The hospital is the largest general hospital in the Carolinas with a capacity of 400 beds. The medical school, which opens October 1, is equipped to receive a maximum of 300 students. The staff is headed by Dr. Wilburt C. Davison, formerly Assistant Dean of Johns Hopkins, Baltimore, and includes approximately seventy prominent physicians and surgeons representing every specialized field of medical science.

The Roaring Gap Children's Hospital at Roaring Gap, has been open for the 1930 summer season with Dr. Leroy J. Butler, of Winston-Salem, as Pediatrician in charge and Dr. B. E. Pulliam, Resident Physician.

The Children's Hospital at Wrightsville Beach, with

(Continued on Page 38)

Not one need die---
Not one need suffer

The results already attained in the fight to eradicate diphtheria prove that by applying the scientific knowledge and resources at the command of physicians not one child need die from this dreaded childhood disease—not one need suffer.

The educational work of the campaigns must be continued by physicians. Now, when children are returning to schools—when the Diphtheria Incidence Curve begins its upward climb—is the time for immunization of all unprotected children.

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No. 3	2½ - 3½ years
No. 4	3½ - 4½ years
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(Continued from Page 36)

Dr. J. Buren Sidbury as physician in charge, has been open for the summer.

Dr. H. W. Lilly, of Fayetteville, the oldest physician in Cumberland County Medical Society, was honored recently by a testimonial meeting of that Society.

Dr. Ivan M. Proctor, Raleigh, spent several weeks in the University of Vienna and the University of Berlin studying obstetrics and gynecology.

The High Point Hospital, High Point, has built an addition to its present buildings that will double the capacity. A modern nurses' home has recently been completed. This is the private hospital of Dr. John T. Burrus.

The hospital of Dr. J. M. Davis, Statesville, is being doubled, giving a capacity of 150 beds.

Dr. Wm. deB. MacNider, Kenan Research Professor of Pharmacology in the Medical Department of the University of North Carolina at Chapel Hill, has been elected to the National Board of Examiners as Examiner in Pharmacology.

Dr. W. B. Kinlaw, Rocky Mount, has charge of the Tuberculosis Clinic in Rocky Mount and Nash County.

Dr. A. R. Shands, Jr., formerly of Washington, D. C., is located now at Durham, where he is in charge of the Department of Orthopedics in the Duke University School of Medicine and Hospital.

The Annie Penn Memorial Hospital, Reidsville, was dedicated a few months ago. It has fifty beds and six bassinets, and is open to both whites and negroes.

Dr. Marion Y. Keith, Greensboro, Dr. J. Buren Sidbury, Wilmington, and Dr. Leroy J. Butler, Winston-Salem, were delegates to the annual meeting of the American Pediatric Society held at Montreal, Canada.

Dr. Arthur S. Pendleton, at one time a member of the medical staff of the State Hospital, Raleigh, has been assigned to the United States Veterans' Bureau in Richmond as neuropsychiatrist.

Dr. L. W. Corbett, Health Officer of the County of Wayne, has resigned to engage in private practice at Goldsboro.

Deaths

Dr. George Collins, Raleigh, aged 34, died June 11.
Dr. James Allen, Wendell, aged 74, died July 20.

OKLAHOMA

At the annual meeting of the Oklahoma State Medical Association at Shawnee, Dr. Edmund S. Ferguson, Oklahoma City, was elected President; Dr. H. C. Weber, Bartlesville, President-Elect; Dr. Claude A. Thompson, Muskogee, Secretary-Treasurer.

Dr. A. W. Heffleman, of Picher, has moved to Grove.

Dr. J. M. Lanning, of Picher, has moved to Shawnee.

Dr. F. M. Black, formerly of Miami, has located in Kansas City, Missouri.

Dr. Benjamin Davis, Cushing, visited various surgical centers in Europe during the summer.

Dr. E. S. Lain, Oklahoma City, visited various European centers this summer and attended the International Dermatological Association, which met at Oslo, Norway.

Deaths

Dr. William Richard Clement, Tulsa, aged 61, died May 24, of acute osteomyelitis of the tibia.

SOUTH CAROLINA

Clinics were conducted the latter part of July by Dr. Paul Ringer, of Asheville, and Dr. Horton Casparis, of Vanderbilt University, Nashville, Tennessee, at State Park Sanatorium, State Park, for South Carolina physicians.

Dr. Edgar A. Hines, Jr., of Seneca, has accepted a position as Resident Physician at the Spartanburg General Hospital, Spartanburg. Dr. Hines was recently elected Assistant to the Secretary-Editor of the South Carolina Medical Association.

An award, established by Dr. Mazyck P. Ravenel, Columbia, Missouri, in commemoration of the mem-

(Continued on Page 40)

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B. B. Culture Laboratory, Inc.

YONKERS, NEW YORK

(Continued from Page 38)

bers of the Ravenel Family who have contributed to science and medicine, was given to Dr. I'On Luten Weston for his thesis on malaria at the commencement of the Medical College of the State of South Carolina recently.

The following changes have been made in the faculty of the Medical College of the State of South Carolina: Dr. Olin B. Chamberlain, Assistant Professor of Medicine; Dr. Robert B. Gantt, Assistant Professor of Urology; Dr. Josiah E. Smith, Assistant Professor of Rhinology and Otolaryngology; Dr. Francis W. Porro, Lecturer in Pharmacology; Dr. Pierre G. Jenkins, Lecturer in Ophthalmology; Dr. Powell M. Temples, Lecturer in Clinical Pathology; Dr. Eugene C. Hood, Lecturer in Bacteriology; Dr. Thomas H. Byrnes, Instructor in Pathology; Dr. Paul W. Sanders, Instructor in Urology; Dr. John M. van de Erve, Instructor in Physiology; Dr. Robert B. Rhett, Instructor in Ophthalmology; Dr. Robert M. Hope, Instructor in Rhinology and Otolaryngology; Dr. James D. Whaley, Assistant in Urology; Dr. John Sughrue, Assistant in Obstetrics; Dr. William H. S. Speissegger, Assistant in Medicine; Dr. Isaac R. Wilson, Jr., Assistant in Surgery; Dr. James P. Palmer, Assistant in Roentgenology; Dr. George H. Zerbst, Assistant in Rhinology and Laryngology.

Dr. Roy de Witt Sumner and Miss Eloise Barron, both of Rock Hill, were married June 5.

Deaths

Dr. W. Minott Gaillard, Georgetown, aged 58, died May 27 of myocarditis.

Dr. James Thornwell Hay, Boykin, aged 50, died June 10 of cerebral hemorrhage.

TENNESSEE

At the recent annual meeting of the National Board of Medical Examiners Dr. Waller S. Leathers, Nashville, was elected President.

(Continued on Page 42)

Calcium Deficiency in Infants

"A baby fed on pasteurized milk over a long period receives too little calcium for his growth requirements." (A. L. Daniels & G. Stearns, Journal of Biological Chemistry, Aug. 1924).

Kalak Water is rich in available calcium and can be employed as a drinking water for infants or incorporated in feeding formulas.

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Focus Your Attention on Food When Prescribing for That Sick Baby

Normal metabolism depends not only on the digestion of food but on its assimilation as well!

Acidosis in diarrhea is usually due to starvation and, therefore it is important to consider that **infants cannot stand prolonged starvation.** An easily assimilated food must be supplied which will replace the loss of fluid from diarrhea and vomiting!

Dryco Makes An Ideal Transitional Food

Whenever the infant has been deprived of all food, DRYCO, **because it can so easily be prepared as to degree of concentration,** adapts itself readily to the weakened digestion of the sick baby! The protein of DRYCO is 97 per cent assimilable. The vitamins are unimpaired!

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Write for fees and directions.

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(Continued from Page 40)

At the thirty-sixth annual meeting of the Upper Cumberland Medical Society held at Red Boiling Springs in the spring Dr. R. C. Gaw, Gainesboro, was elected President and Dr. Z. L. Shipley, Cookeville, Secretary.

The Tri-County (McMinn, Monroe and Loudon) Medical Society met at Athens on August 21. Several visiting physicians were on the program. A feature of the meeting was the luncheon at the Hotel Robert E. Lee with addresses by several prominent laymen. Dr. J. G. Eblen, Lenoir City, is Secretary.

Dr. E. C. Eliett, Memphis, was recently given a dinner honoring his election to the presidency of the American Ophthalmolcgical Society, the oldest organization of its kind in the world.

Dr. William K. Sheddan, Columbia, missed only two meetings of the Middle Tennessee Medical Association since the society was organized. He was recently awarded a silver loving cup by the society for having the best attendance record of any member of the society.

A study of the county health work and administrative program of the Tennessee Department of Health was made recently by Dr. Li Huo Ou, of Shanghai, China.

Dr. R. E. L. Smith, Knoxville, has been elected State Vice-President of the Exchange Clubs.

Dr. F. H. Gault, formerly of Cornersville and Florida, is now located in Lewisburg.

Dr. A. E. Ray, formerly connected with the U. S. Hospital at Little Rock, Arkansas, has returned to practice in Tullahoma.

Dr. T. H. Martin has assumed the position of Resident Surgeon in the Nashville General Hospital, Nashville.

Fellowships for four months graduate courses have been granted to the physicians of Gibson County by the Commonwealth Fund of New York, through the county health unit.

(Continued on Page 44)

THE EVIDENCE WHICH SUPPORTS OUR CLAIMS

ACCEPTED AMERICAN MEDICAL ASSN

Simply ask for the complimentary package as advertised

BELIEVING THAT THERE IS NOTHING QUITE SO CONVINCING AS AN ACTUAL TEST WE WOULD LIKE TO SEND EVERY INTERESTED PHYSICIAN A COMPLIMENTARY PACKAGE AS FOLLOWS:

100 TABLETS CALCREOSE 4 GRAINS, A TUBE OF EPHEDRINE NASAL JELLY-MALTBIE
and complete information on these two popular prescription products

REMEMBER, Calcreose is not only a stimulant expectorant in bronchitis and of value in tuberculosis, but is also of value as a urinary antiseptic in frequent and burning urination and as an intestinal antiseptic in enteritis and similar disturbances.

Calcreose—calcium creosotate—is a mixture containing in loose chemical combination approximately equal weights of creosote and lime and provides a form of creosote which patients will tolerate.

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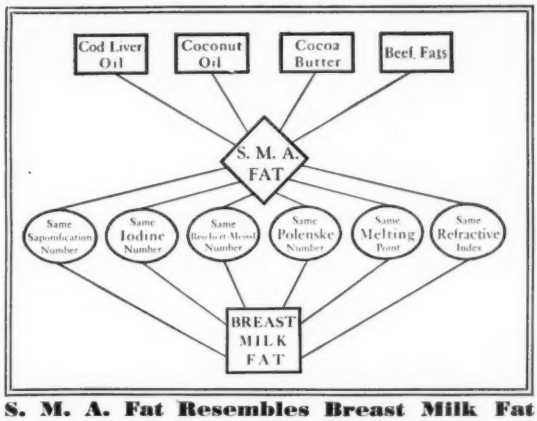

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There are a few physicians who do not realize that there is a great difference in the composition of various ordinary milk fats. Six different chemical and physical tests* prove that the fat in S. M. A. is the same in all important characteristics as the fat in breast milk. (see chart opposite) One of the reasons that others have failed to find a true substitute for breast milk is because they have been unsuccessful in obtaining a fat like the fat in mother's milk. Never before S. M. A. has an adaptation to breast milk contained a fat so similar to breast milk fat. Cod liver oil also forms a part of the fat of S. M. A. in adequate amount not only to satisfy the body's requirements for fat soluble "A" growth factor, but also enough vitamin "D" to prevent rickets and spasmophilia.

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(Continued from Page 42)

Orren W. Hyman, Ph.D., administrative officer of the University of Tennessee College of Medicine, requires each student admitted to the University to have a physical examination annually.

The following appointments on the faculty of Vanderbilt University School of Medicine, Nashville, are announced: Dr. Sam L. Clark, Assistant Professor of Anatomy; Dr. Frank H. Luton, Assistant Professor of Psychiatry; Dr. Harry Hillstrom, Assistant Professor of Surgery in charge of roentgenology; Dr. John B. Youmans, Associate Professor of Medicine and Director of Graduate Instruction. The following promotions are announced: Dr. Alfred Blalock, Associate Professor of Surgery; Dr. George S. Johnson, Assistant Professor of Surgery; Dr. Alvin E. Keller, Assistant Professor of Preventive Medicine and Public Health; Dr. C. Eugene Woodruff, Assistant Professor of Pathology.

Deaths

Dr. S. M. Glenn, Ripley, aged 61, died suddenly April 28, of heart disease.

Dr. W. W. Holland, Dyersburg, aged 45, died June 8.

Dr. James Albert McKenzie, McKenzie, aged 83, died May 15, of carcinoma of the liver.

Dr. C. C. Sullivan, Nashville, aged 63, died on June 29.

Dr. Robert L. Snipes, McMinnville, aged 30, died May 4, of injuries received in an automobile accident.

Dr. J. W. Warren, Forked, aged 60, died May 16, of acute toxic nephritis and carcinomatosis.

TEXAS

A contract has been awarded for construction of the proposed Marine Hospital at Galveston, the structure to cost $506,900.

(Continued on Page 46)

CLASSIFIED ADVERTISEMENTS

PHYSICIAN WANTED for a rural practice in Northern Virginia, fifty miles from Washington, D. C., in a rich, high, beautiful section with good schools, churches, excellent people and some bad roads. Collections 80 to 95 per cent—excellent territory, with good income. Please give the following information in your first letter: Age, married or single, number of children with ages; where born, where educated, when and where graduated in medicine; internship, if any, when and where; religion of self and wife; membership in fraternities, clubs, lodges, etc.; do you hold a license in Virginia? Address, Box 222, Warrenton, Virginia.

X-RAY and laboratory technician desires position with hospital or clinic. Four years' experience. Special training in medical school. College graduate. Best references. Address, H, care S. M. J.

TECHNICIANS are in demand. We are successfully training laboratory and x-ray workers. Send us your assistant and we will return you a competent technician. If you are in immediate need of a well-trained helper, write or phone. Full information upon request. Alabama Pathological Laboratory, Birmingham General Hospital, Birmingham, Ala.

LABORATORY AND X-RAY TECHNICIANS—I have several highly trained combined laboratory and x-ray technicians and office assistants available for positions in hospitals, clinics, surgeons' and physicians' offices, state and municipal laboratories. Dr. L. H. South, Laboratory Service Bureau, Kentucky State Board of Health, Louisville, Ky.

DRUG AND ALCOHOLIC PATIENTS are humanely and successfully treated in Glenwood Park Sanitarium, Greensboro, N. C.; reprints of articles mailed upon request. Address W. C. Ashworth, M.D., Owner, Greensboro, N. C.

physiologic studies on absorption have shown that a **Water-Soluble** salt is readily absorbed by muscle tissue—specific research on **BISMUTH SODIUM TARTRATE** has shown this product of G. D. **Searle** & Co. to be rapidly absorbed (within two or three days) — and it may be **Administered Intramuscularly** without irritation, **In Aqueous Solution.** it does not cause pain, infiltration or tumor formation, the solution is exceedingly stable, its bismuth content is high and toxicity is low.

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G. D. SEARLE & CO. - - Chicago, Ill.

(Continued from Page 44)

The official name of the Texas Public Health Association has been changed to the Texas Tuberculosis Association, effected by a change in the Constitution and By-Laws of the organization. Another change provides for a board membership of 75.

Dr. Jesse D. Riley, formerly of El Paso, is now Superintendent of the Arkansas Tuberculosis Sanatorium, Booneville, Arkansas.

Janet R. McLellan, R.N., has been named Superintendent of the King's Daughters Hospital, Temple.

Plans are being made to raise $100,000 through popular subscription to establish a foundation for child welfare and parent education in the University of Texas.

Deaths

Dr. David Lemuel Bettison, Dallas, aged 49, died May 9 of injuries received in an automobile accident.

Dr. Jesse W. Hale, Yoakum, aged 57, died April 18.

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In Pre-natal Care

For the good of both mother and child, a safe diet is needed which provides the elements for body building, especially for sound bone and tooth formation, without impoverishment of the mother's own organism. Essential also is the energy fuel needed to sustain the mother's strength and vitality.

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For the vital building elements of whole milk, wheat and barley . . . . . .
For a delicious beverage, refreshing to the expectant mother . . . . . .

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Dr. Joseph P. Lee, Fort Worth, aged 48, died June 16 of angina pectoris.

Dr. Thomas Allen Mann, Colmesneil, aged 23, was killed March 3, in an automobile accident.

Dr. Clarence Moore, St. Jo, aged 49, died June 5.

Dr. Stoyell C. Parsons, Abilene, aged 73, died April 25 of diabetes mellitus.

Dr. James William Powers, Wichita Falls, aged 46, died June 16 of heart disease and nephritis following an operation on the gall-bladder.

Dr. Victor Charles Strauss, East Bernard, aged 30, died May 1, of ruptured appendix.

VIRGINIA

Loudoun County Medical Society has reelected Dr. G. Frank Simpson, Purcellville, President; Dr. J. B. Hackley, Purcellville, and Dr. G. H. Musgrave, Vice-Presidents; Dr. W. O. Bailey, Leesburg, Secretary-Treasurer.

Post-Graduate Medical Society of Southern Virginia has elected Dr. Joel Crawford, Yale, President; Dr. H. G. Stoneham, Waverly, and Dr. W. W. Bennett, Blackstone, Vice-Presidents; Dr. Philip Jacobson, Petersburg, Secretary-Treasurer, reelected.

Second District Medical Society has elected Dr. Geo. Richardson Joyner, Suffolk, President; Dr. James A. Grizzard, Drewryville, Vice-President; Dr. F. C. Rinker, Norfolk, Secretary-Treasurer.

Northampton County Medical Society has elected Dr. H. L. Denoon, President; Dr. W. T. Green, Jr., Vice-President; Dr. W. Carey Henderson, Secretary-Treasurer, all of Nassawadox.

Norfolk County Medical Society elected Dr. Franklin D. Wilson, President; Dr. Harry L. Myers, Vice-President; Dr. Lockburn B. Scott, Secretary-Treasurer, all of Norfolk.

The following faculty additions and promotions at the Medical College of Virginia have been announced: Dr. Goldsborough F. MacGinnes, Associate in Preventive Medicine; Dr. Harry G. Grant, Associate in Preventive Medicine; Dr. Allan L. McLean, Associate in Preventive Medicine; Dr. Blake W. Meador, Associate in Dermatology and Syphilology; Dr. James Asa Shield, Associate in Nervous and Mental Diseases; Dr. Joseph Bear, Assistant Professor of Obstetrics; Dr. James G. Lyerly, Professor of Oral Surgery; Dr. Robert S. Preston, Assistant Professor of Medicine; Dr. Harry B. Sanford, Associate in Obstetrics; Dr. Clifford W. Skinner, Associate Professor of Anatomy; Dr. Daniel D. Talley, Jr., Associate Professor of Roentgenology; Dr. John Powell Williams, Associate in Medicine.

Dr. Emory Hill, Richmond, has been reelected Secretary of the American Ophthalmological Society.

Dr. and Mrs. F. H. Crawford, of Mt. Sidney, spent a year in Vienna, where Dr. Crawford took post-graduate work in diseases of the eye, ear, nose and throat.

Dr. Hal McCoy, Crozet, has moved to Kahului, Maui, Hawaii.

(Continued on Page 48)

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(Continued from Page 46)

Dr. and Mrs. Wyndham B. Blanton, Richmond, sailed for Europe to visit Lisbon, Athens, Egypt, Palestine and Italy.

Dr. Harry R. Seelinger, Norfolk, was named junior vice-commander of the Virginia Department of Veterans of Foreign Wars.

Dr. Charles P. Cake, who has been Senior Resident Physician in the Tuberculosis Division of the Herman Kiefer Hospital, Detroit, Michigan, for several months, will return to Norfolk after completion of his work there.

Dr. Charles S. Groseclose, formerly of Ivanhoe, is now located at Buena Vista after completing an internship at Jefferson Hospital, Roanoke.

The Alumni Association of the Medical College of Virginia elected Dr. Walter E. Vest, Huntington, West Virginia, President; Dr. W. H. Street, Richmond, Vice-President; Dr. Joseph D. Collins, Portsmouth, Vice-President; Dr. Charles L. Outland, Richmond, Secretary; Dr. F. H. Beadles, Richmond, Treasurer.

The Richmond Council of Social Agencies unanimously reelected Dr. Greer Baughman, Richmond, President, and elected Dr. W. Brownley Foster and Dr. Fred J. Wampler members of the executive committee.

The City Council relected Dr. Ramon D. Garcin, Dr. Roshier W. Miller and Dr. Clifton M. Miller as members of the Richmond City School Board for a term of two years.

Dr. James S. Chalmers, formerly of Appalachia, leased and reopened the Home Hospital at Sand Springs, Oklahoma, and is now engaged in industrial surgery there.

Dr. Robert Lemmon, for some years of Lynchburg, succeeds the late Dr. R. Bruce James as Post Surgeon at the Virginia Military Institute at Lexington, effective September 1.

Dr. S. G. Miller, who spent a year at the Chesapeake and Ohio Hospital, Huntington, West Virginia, is now at Warm Springs.

Mrs. Southgate Leigh, Norfolk, former President of the Woman's Auxiliary to the Medical Society of Virginia, has been elected First Vice-President of the Woman's Auxiliary to the American Medical Association.

Dr. George B. Fadeley, Falls Church, has been elected President of the Falls Church Bank.

Dr. William A. Reese has been appointed as City Physician of Petersburg to look after the sick poor of that city.

Dr. Herbert W. Rogers has been elected a member of the Norfolk City School Board for a term of one year.

Dr. Hunter H. McGuire, Winchester, has been elected Vice-Chairman of the Section on Ophthalmology of the American Medical Association.

Dr. Charles L. Savage is one of the Assistant Physicians to the Blue Ridge Sanatorium, Sanatorium. He recently completed his internship at the University of Virginia Hospital.

Dr. Lewis A. Law, Alberta, took post-graduate work in cardio-vascular diseases at Harvard Medical School recently.

Hattie Sue Jones, Supervisor of Memorial Hospital at Danville, is now Superintendent of the new Anne Penn Memorial Hospital, Richmond.

Dr. A. Lacy Tynes, Staunton, and Miss Bessie Mead Riddle, Norfolk, were married June 21.

Dr. Haddon C. Alexander, Jr., Farmville, and Miss Judith Harris Watson, Old Church, were married June 18.

Dr. Early Thomas Terrell, Ashland, and Miss Eugenia Jackson Beazley, Beaver Dam, were married June 18.

Dr. Samuel Armistead Anderson, Jr., Richmond, and Miss Frances Webster, Boston, Massachusetts, were married June 16.

Dr. James Alvis Soyars, Saltville, and Miss Billie Barnes, Abingdon, were married the latter part of June.

(Continued on Page 50)

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Promptly relieves

Pain - Burning - Frequency

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Caprokol (Hexylresorcinol, S & D) exerts a marked analgesic action on the urinary mucosa, affording almost immediate ease and comfort to the patient.

The active bactericidal effect of Caprokol in the urine may be relied upon to check existing infection and to prevent its introduction when frequent or prolonged catheterization becomes necessary.

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This word came yesterday from a distinguished M.D.
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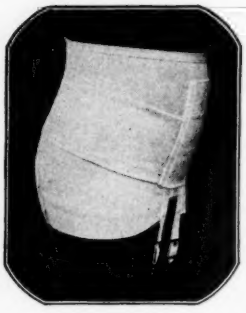

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Hose supporters attached.

Takes Place of Corsets

Adaptable to Pregnancy, Ptosis, Hernia, Obesity, Sacro-Iliac Relaxation, High and Low Operations, etc.

Ask for Literature

Each belt made to order in 24 hours
KATHERINE L. STORM, M.D.
Originator, Owner and Maker
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(Continued from Page 48)

Deaths

Dr. Jesse Garvin Carter, Richmond, aged 44, died June 27 of acute angina pectoris.

Dr. Samuel Conway Crow, Norfolk, aged 55, died April 11, of hypertrophic cirrhosis of the liver.

Dr. Christopher Clark Collins, Lynchburg, aged 58, died May 11, of heart disease.

Dr. David Thomas Gochenour, Stuart Draft, aged 50, died June 4, of pneumonia.

Dr. Lynn J. Gallup, Norfolk, aged 52, died May 4 of cerebral hemorrhage.

Dr. Robert P. Kelley, Lynchburg, aged 51, died June 10.

Dr. Schuyler Barclay Moon, Richmond, aged 63, died July 12.

Dr. Leslie B. Wiggs, Richmond, aged 49, died June 16.

WEST VIRGINIA

Dr. Walter E. Vest, Huntington, has been elected President of the Alumni Association of the Medical College of Virginia, Richmond, Va.

Dr. Albert H. Hoge, Bluefield, and Dr. R. H. Walker, Charleston, have been appointed by the Governor as members of the West Virginia Public Health Council.

Dr. Fonzo G. Prather, Wharton, and Miss Kathleen Virginia Sleek, of Jellico, Tennessee, were married March 15.

Dr. Abner O. Albin, Charles Town, and Miss Elva Correll, of Philippi, were married June 7.

Deaths

Dr. Arthur John St. Lawrence, Fairmont, aged 42, died in June of heart disease.

Dr. Gideon Thomas Plummer, Bayard, aged 71, died May 25, of diabetes mellitus and goiter.

Dr. John T. Sharp, Charleston, aged 58, died June 29 of heart trouble.

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can be effective only through the use of dependable endocrine products. The reputation and integrity of the manufacturer is the physician's only guarantee of reliability of those organotherapeutic products for which there is no chemical or biological assay. Every manufacturing process of all our products is supervised by our Analytical and Research Department.

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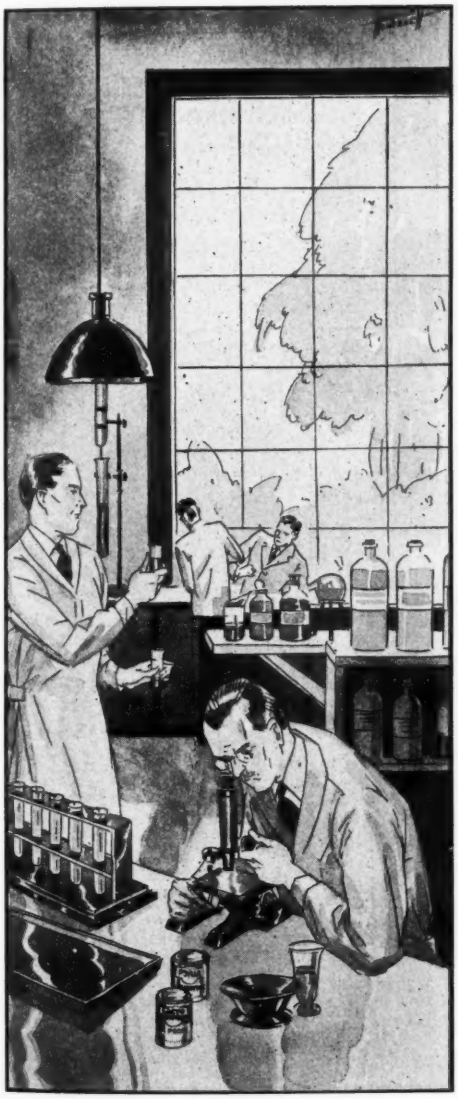

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Where putrefaction exists, as evidenced by intestinal flatulency and foul-smelling stools, carbohydrate is needed to enable the protective organisms to gain the mastery.

The ordinary carbohydrates (sugar and starch), however, which form the bulk of our daily food, are not suited to this purpose because they are absorbed in the small intestine.

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(lactose 73%—dextrin 25%)

provides an ideal colon food for promoting the desired change in the intestinal flora.

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In Rickets, Tetany and Osteomalacia

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AMERICAN PIONEER STANDARDIZED ACTIVATED ERGOSTEROL

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MEAD'S Viosterol in Oil, 100 D
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In Rickets, Tetany and Osteomalacia

MEAD'S

VIOSTEROL

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AMERICAN PIONEER STANDARDIZED ACTIVATED ERGOSTEROL

(2) The clinical experience which safely settled the question of activated ergosterol dosage was obtained under fellowships established by Mead Johnson & Co., at five leading universities. This rich experience is behind every bottle of Mead's Viosterol in Oil, 100 D (originally Acterol)—the American Pioneer—Council-accepted.

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Mead Johnson & Co., Evansville, Indiana

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Licensed by Wisconsin Alumni Research Foundation. Supplied in 5 cc. and 50 cc. bottles with standardized dropper. Patients find the large size economical. Due to the recent change in name, it is now necessary to specify Mead's to get the American pioneer product

To get the identical product, originally called Acterol, specify MEAD'S Viosterol in Oil, 100 D. It is made in the same laboratories under the same conditions by the same longest-experienced personnel with the same clinical background of the five fellowships that established potency and dosage. Specify MEAD'S Viosterol to get the same identical product.

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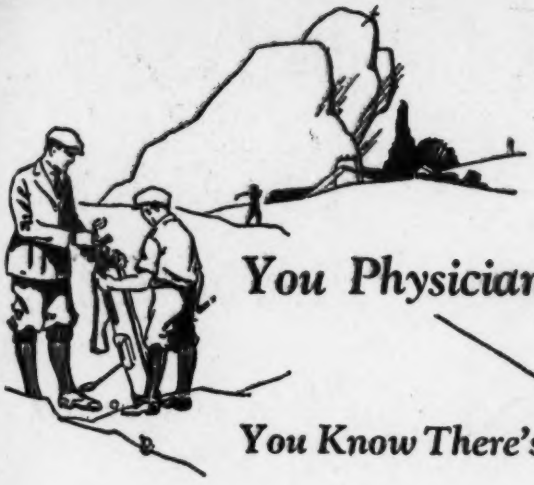

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Dextri-Maltose is the carbohydrate of your choice for balancing all of the above "strokes" or formulae and aptly may be compared with the nice balance offered the experienced player, by matched clubs.

To each type of formula (be it fresh cow's milk, lactic acid milk, protein milk, evaporated or powdered milk), Dextri-Maltose figuratively and literally supplies

the nicely matched balance that gets results.

PHYSICIANS' BABIES ARE BETTER BABIES

Dextri-Maltose No. 1 (with 2% sodium chloride), for normal babies. Dextri-Maltose No. 2 (plain, salt free), for salt modifications by the physician. Dextri-Maltose No. 3 (with 3% potassium bicarbonate), for constipated babies. "Dextri-Maltose With Vitamin B" is now available for its appetite-and-growth-stimulating properties. Samples on request.

MEAD JOHNSON & COMPANY, EVANSVILLE, IND., U.S.A.

"Laugh and be fat"
Anarchy in the human body
You should know these facts about cancer
When the heroes in your blood send out an "S. O. S."
"Rheumatic diseases do abound"
—Midsummer Night's Dream, Act II, Sc. 1

Bridging the Gap

between "the man on the street" and the physician in his office

By means of the most dramatic and appealing "copy" that we can devise, aided by convincing, human-interest illustrations, the "see your doctor" message is being put before the general public in a way that has never been attempted before.

Facts which the public should know about some of the common but perplexing affections requiring a physician's skill for their treatment —conditions such as cancer, anemia, obesity, rheumatism—are the subjects of current advertisements which are appearing over the signature of Parke, Davis & Company in such magazines as the *Saturday Evening Post*, the *Literary Digest*, *Hygeia*, *Time*, and *Collier's*.

By publishing authentic, non-technical information about such diseases, and by proving how *intricate* these diseases are, we are endeavoring to show people *why* they should go to their doctor for consultation and treatment.

It is our sincere belief that this unique campaign of advertising, which has been running uninterruptedly for the past two years, is helping, in a measure, to bridge the gap between the man and the woman on the street and the physician in his office.

Copies of the full-page advertisements which are pictured above will be gladly sent you if you will drop a line to our Detroit laboratories.

PARKE, DAVIS & COMPANY

DETROIT, MICHIGAN

NEW YORK KANSAS CITY CHICAGO BALTIMORE NEW ORLEANS MINNEAPOLIS SEATTLE

In Canada: WALKERVILLE MONTREAL WINNIPEG